JUN 13 1933

THE ENGINEER-IN-CHARGE

The ELECTRICAL REVIEW

FOUNDED 1872

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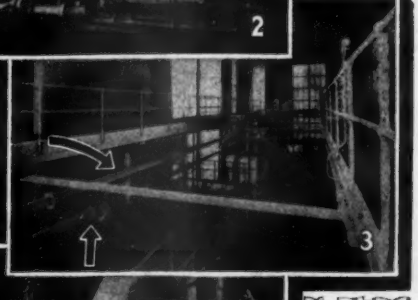

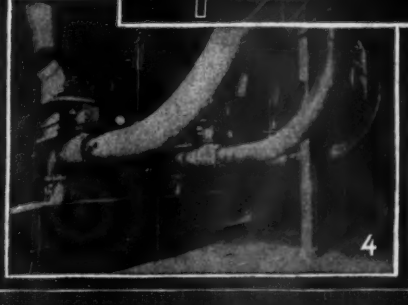

A BABCOCK PULVERISED FUEL CENTRAL PREPARATION PLANT

The large illustration shows the central preparation plant in which the coal is dried and pulverised for burning under six B. & W. boilers of a total capacity of 934,000 lbs. of steam per hour, the boilers being in a separate building.

The coal is received in the preparation plant in the raw coal storage bunker, from whence it passes through a rotary drier, which reduces the moisture content from 15–16% to ½%. On leaving the drier the coal is elevated to the three 70 in. Lehigh Air Swept Mills shown in illustration No. 1. The pulverised fuel is collected in cyclones, of which there are three, to each of which is connected an 8 in. Fuller Kinyon Pump—shown in illustration No. 2, which pump the coal to the main pulverised fuel bin in the preparation plant, underneath which are situated two 10 in. Fuller Kinyon Pumps which convey the pulverised fuel to the storage bunkers in the boiler house.

Illustration No. 3 shows the transport lines in the boiler house with the automatically operated electro-pneumatic switching valves above the storage bins.

Situated on the underside of the pulverised fuel bins in the boiler house are the Bailey Feeders—shown in the illustration No. 4—which, due to the constancy of feed, are also used as pulverised fuel meters.

The photographs have not been re-touched.

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Distribution Economies

THE large amount of data made available regarding power station operation has undoubtedly contributed to the progressive improvement in thermal efficiency noticeable during the past several years. The statistics for the 119 existing stations selected for operation under the grid are in a very complete form; the others will not matter.

But each of the 670 or so undertakings that make up the total has its transmission and distribution system. There is a tendency to regard improvement in distribution efficiency as the same thing as load building. So it is to a very large extent, as the costs vary little with the number of kWh sold, whereas a large proportion of generating costs increase directly with output.

Yet there is quite an appreciable technical field in which distribution economies may be found. Thus, busbar voltages are often higher than they need be. This is no doubt largely due to the official requirement that for voltages above 3,000 the undertaking shall declare a minimum pressure, and the undertaking (to be on the safe side) keeps the busbar voltage high. With modern methods of automatic on-load tap-changing and induction regulation this caution should be unnecessary.

From an American technical journal we learn that the Public Service Co. of Illinois recently reduced the busbar voltages of several of its sub-stations by 5 per cent. with an appreciable saving in transmission losses. This was presumably due, in the main, to transformers having been previously over-magnetised, since an excess of one per cent. in magnetisation may increase the loss due to this cause by as much as 2 per cent. In addition there is the effect on power factor due to the higher voltage impressed on the stators of induction motors and the loading of the mains with wattless current.

Another point that is worth looking into is whether, with growing load factors, transformers designed for low iron losses should not be transferred to points at which the lighting load predominates, replacing them by units with low copper losses. For a transformer of given proportions low iron losses can normally be obtained only at the expense of high copper losses, and views held as to the relative values of the two are sometimes out of date. Low copper losses also make for greater reliability as they entail less likelihood of local heating. Due weight should be given to the probability of the effective load factor of copper losses being less than that apparent, due to their peculiar form factor.

The effect of sudden overload on transformers is often more mechanical than electrical. Investigation will often show the precaution of running more units in parallel than is required for electrical considerations to be unjustified.

The foregoing will suggest a few of the ways in which keen distribution engineers may be able to reduce the losses (amounting to one-eighth of the kWh sent out) between the station busbars and the consumers' terminals. They can usefully exercise their imaginations in discovering others. It will be well worth doing.

The Return on Rural Supply

IT is noteworthy that a division into two groups of the undertakings controlled by Edmundson's Electricity Corporation, one including those that have been controlled for a very long period and the other the recent acquisitions, reveals an almost identical rate of increase in both. The operations of the company are now, with a balance sheet of close upon ten million pounds, very different from those obtaining in the early days when Edmundson's started their pioneering work in small towns, a form of enterprise which presented substantial difficulties and led many people to doubt whether the principle could be carried to commercial success. Sir Holberry Mensforth claimed last week that the Corporation was carrying out the largest development of rural areas in England. The fact had to be faced, however, that time was required to allow these new

enterprises to become dividend-paying. Unless and until that happens new capital will be shy; so with the determination to secure success a real amalgamation of Edmundson companies is being concentrated upon with reduced costs and a common policy of enterprise as the objectives.

Chloride Expansion

To be able to show a larger volume of business, measured by value or tonnage, during 1932, than in any previous year is a fine performance. Such, however, was the result achieved by the Chloride Electrical Storage Co., Ltd., as reported by Mr. W. S. Naylor, M.I.E.E., the chairman, at last week's meeting. There was a definite expansion in export business notwithstanding currency restrictions and tariff barriers. The company is constantly developing new products in the battery field for all classes of work, its safety lighting equipment is in full demand, and its system of "service" is everywhere. The organisation is such that given freer conditions for operations throughout the world, the company's export trade will quickly expand still further. Mr. Naylor aptly described the present situation as "driving with the brakes on."

Satisfied Farmers

In their inspection of the Bedford rural electrification scheme, the Development Commissioners showed a sense of the realities of the position by seeking the opinions of the actual users. They found the farmers more than satisfied with the results obtained in the use of electricity in connection with the sterilisation of milk bottles, pumping, incubation, brooding, sheep-shearing, and milking—to name the principal applications in vogue in the area. Cows hitherto refractory had become quiet during milking, and the cost for one herd of fourteen cows was given as £3 for nine months. It is satisfactory to hear from Lord Cavendish that the Development Commissioners have come to the conclusion that, even if a small amount of help from the Treasury should be required, the money has been most profitably spent. The service value and the goodwill towards electricity promoted by such means is far higher than is reflected in the increased output of generating stations due to the specific demands.

Electricity Staff Changes

In view of the changes that are taking place in the affairs of small electricity undertakings it would be useful if there were available some more or less authoritative guidance as to the details of staff organisation required, both technical and commercial. No rigid standard applicable to all cases is either possible or desirable, but a general scheme might be drawn up from which variations could be made according to special local circumstances. In some cases change-over from one appointment to another may enable the best use to be made of qualifications and experience. In others additional appointments of a new kind may be necessary if commercial progress on modern lines is to be made. A point for emphasis is that failure on the part of committeemen or councillors, to understand the importance of the new work and the qualifications required for it, must not allow a niggardly disposition to creep in when adding to the staff, whether male or female. Both the E.P.E.A. and the E.A.W. should be able to exercise influence in this matter.

Fifteen Shillings

Bedford Town Council, so conspicuous for its enterprise in rural electrification, has, if local Press reports are correct, decided to add to the staff for handling increased business in the Electricity Department. It has adopted the Committee's advice to appoint a "female assistant" at 20s. per week, and an "assistant lady demonstrator" at 15s. per week, with the only alteration that for "female" the word "lady" be substituted. Exactly what these appointments are is not clear—apparently the female assistant is to have a lady demonstrator to assist her, but be that as it may, a facetious correspondent, envious of those big "salaries," as they are termed, remarks that the description in each case should be preceded by the word "Honorary." He does not propose that only members of the E.A.W. need apply. Our own charitable deduction is that both appointments are for junior assistants in the clerical department, or for beginners or apprentices to learn the business of demonstration and business-getting, from which they will ultimately be able to earn a living wage. We find it difficult to regard fifteen shillings a week as an adequate remuneration for a person possessing the personality and qualifications worthy of the title "assistant lady demonstrator."

Siemens's 75 Years

In the year 1858 Siemens's began manufacturing operations at Millbank, Westminster, and it was with justifiable pride that Lord Queenborough referred last week at the meeting of Siemens Bros. & Co., to the large contribution made by the company toward the utilisation of electricity for power, lighting and communication during what has been industrially the most remarkable period in our history. During the seventy-five years there has been a continuous succession of electrical developments which have been of inestimable benefit to mankind and have, as the speaker remarked, exercised a powerful influence on world affairs and our modern civilisation. Operating under a name that always has been and always will be great in the electrical world the company has a record entitling it to claim that from the beginning it has played a noteworthy part in promoting the aims of electrical science, has contributed substantially to the advancement of the electrical industry, and has rendered an essential service to the State. Lord Queenborough's speech contained a mass of detailed information regarding the achievements of the year in different sections of the business. The electrical industry is so interlocked with all our other industrial interests and is so vital to the well-being of the people of all lands, that it cannot fail to feel the benefit of world awakening.

Welding Apprentices

A little while ago we called attention to the drawbacks of the present methods of recruiting welders in shipyards, having regard to the rapid developments in this important application of electricity. The Shipbuilding Employers' Federation has approached the trade unions most directly concerned with a view to the creation of a new skilled class of workmen, who after a specified period of training would be graded as welders and paid 60s. per week. We are informed that the trainees would not be drawn from any one class, but would be selected for their aptitude from apprentices who had already served part of their time in the shipyards or from others with shipyard experience. Welding provides opportunities for really skilled craftsmanship, and its progress, to the extent to which we should like to see it, is so largely dependent upon sound workmanship, that any steps taken to ensure the maintenance of a high standard are to be commended.

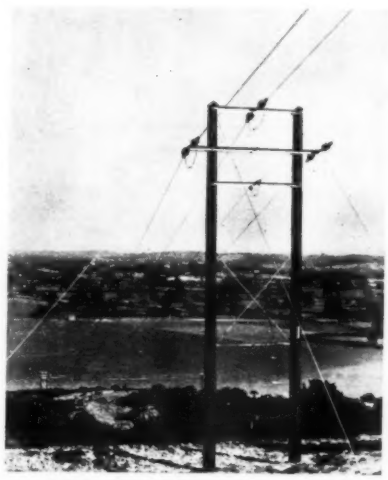
A Bigger E.D.A.

Matters are moving rapidly toward a definite conclusion regarding the future of the British Electrical Development Association. Rumour has been very busy lately, which is not unnatural seeing how many separate interests have had to be consulted. A decision was nearly reached last week, but we have good reason to believe that before these lines are printed a new scheme providing for an enlarged and altered organisation with ampler funds at its disposal will have been approved. At the time of writing proceedings are in progress in London which should bring to the final stage the discussions which have been in progress for some time past.

DEVELOPMENT AT DORKING

SCENICALLY, the Dorking district is typical of picturesque Surrey. Electrically it demonstrates strikingly the manner in which supplies of electricity can be made available throughout a wholly rural area, adding to the convenience and comfort of country dwellers in general, and materially assisting farming operations in particular without depreciating local amenities or detracting from the beauties of the countryside.

This development is taking place in the outer zone of the London and Home Counties Joint Electricity Authority's distribution area, and is proceeding rapidly under the instructions of the chief engineer, Mr. F. W. Purse, M.I.E.E., M.I.Mech.E., and directed locally by Mr. Gill, the district officer. The whole of the distribution is being carried out by overhead lines, with the exception of small sections of underground cable, under the direction of Mr. T. H. Petty, A. A. I. E. E., mains engineer for the Dorking area. The rural district totals some 80 square miles, having a population of 12,000, which is equivalent to 1,500 per square mile, or three acres per person.



The top of the long Box Hill span

When completed the 400/230-V distribution will be served by sixty-four step-down transformers, of an average individual capacity of 50 kVA, fed by fifty-one miles of overhead 11-kV transmission lines connected by underground 11-kV cable at three points—two at Dorking and one at Westcott, all under ring main control.

The Amenities Preserved

With the exception of five miles of 11-kV line built by the Pirelli-General Cable Works, Ltd., between Dorking and the Buckland Sand Co., all north spurs, and also all l.p. distributors have been erected by the Authority's local staff. How thoughtfully this has been done, with careful site selection, poles set well back in the roadside hedges and behind houses wherever possible, avoiding straight sky-lines in order to minimise obtrusiveness, will be evident from fig. 4 (page 769), which illustrates conspicuous Post Office lines on the right while the power lines are almost hidden in the foliage on the left of the road. Figs. 1 and 5 indicate how well typical low-voltage four-wire distributors blend with the landscape. Double-ended insulator through-bolts are employed so that services from the 0.1 sq. in. stranded copper conductors may be taken off either side of the pole. The line conductors are spaced at 9-in. centres, which represents a reduction of 9 in. in pole height. Fig. 1 is an example of a neatly arranged four-wire three-way distributor pole fitted with aerial fuses (Yorkshire Switchgear & Engineering Co., Ltd.).

A typical terminal H-pole is shown in the illustration on the right. Erected on it are one 50-kVA three-phase transformer; high voltage (Henley's); low voltage (Yorkshire Switchgear Co.); cable boxes; and a pull-down switch fuse and horizontal section switch (Switchgear & Equipment, Ltd.). Both these switches are controlled from the base of the pole, hand operated levers being provided for this purpose.

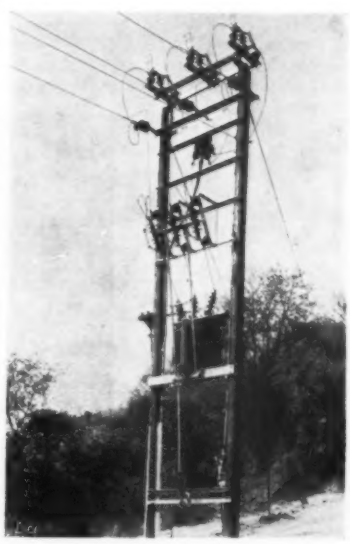
The section switch controls the 11-kV line to Box Hill, a well-known beauty spot, up the face of which it ascends in a single span of 915 ft., as shown in the heading block. This span is believed to be the longest for the size of conductor used in Great Britain. The conductor is 0.06 sq. in. copper equivalent steel-core aluminium, erected on 38 ft. by 13 in. diameter "H" poles with 8-ft. centres, and spaced at 12-ft. horizontally and 7-ft. diagonally. Below the conductors is one 7/12 s.w.g. "Crapo" galvanised steel earth wire, this having a 7-ft. diagonal spacing. The acute angle at which the wires hang makes the sag very small.

It was originally intended to construct this section with the light type of line described below, which would have followed a slightly different route, but in response to the request of the inhabitants, who considered that the light line might show up rather prominently from certain points, the construction described was adopted, although it necessarily involved a greatly increased cost. Considering its exposed position this line is inconspicuously contrived.

Light-line Construction

A special light-line construction which is being erected relatively cheaply in districts where the load is not expected to exceed 200 kW per mile is illustrated in fig. 6. Above the steel earth wire, the three No. 8 s.w.g. copper conductors are supported by Buller's "P.5064" insulators on galvanised swan-neck (cup-holder) fittings, the span being 210 ft. The 34-ft. poles are treated in order to eliminate the need for pole roofs, and road-crossing poles are fitted with arcing horns instead of earth bars, twin cup-holders and duplicate insulators. The junction of this line with the 11-kV ring main is controlled by a Crompton Parkinson oil-immersed circuit breaker, pole mounted as shown in fig. 7, and operated by a lever from ground level.

To assist the speedy completion of the scheme, Overhead, Ltd., undertook to erect for the J.E.A., under contract, part of the ring main commencing at Betchworth, and a diametrical interconnector in the southern portion of the area. (See map.) Stranded copper conductors of 0.06 sq. in. section with a 7/12 s.w.g. steel earth wire are being used. The spurs are not provided with an aerial earth wire, each pole being independently earthed.



A transformer and switch pole

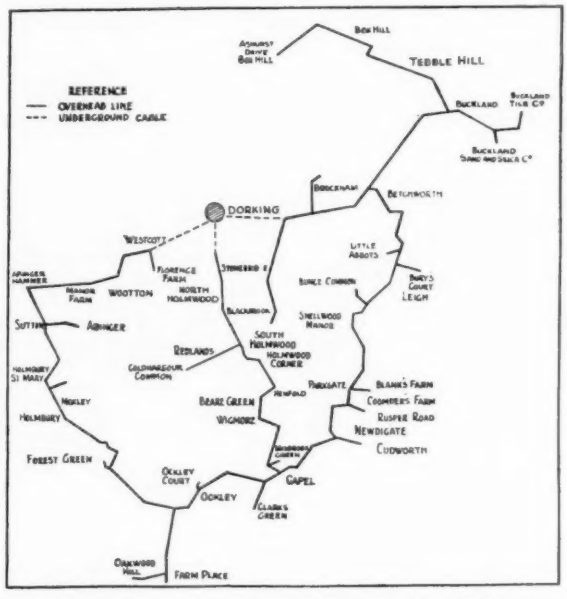
The type of construction adopted by Overhead, Ltd., differs in these cases from that of the lines erected by the Dorking staff in that in place of the one-piece pole top fitting (fig. 7) a 3½ in. by 2 in. channel cross-arm is attached to the pole by a ¾-in. bolt and supported by two sturdy straps of flat galvanised iron, held in the centre of the pole by a coach screw. The pole head bracket consists of a piece of flat galvanised iron shaped to pattern and held by two bolts through the pole.

Section poles in straight-line positions where deviations are

made consist of double cross-down channels exactly similar, with insulators supported by two flat galvanised straps. The pole top bracket is made of two pieces of galvanised channel, braced across the top. The insulators throughout the southern ring are of Buller's make; the strain sets are of the T.4838 type, two 10 in. discs being used in series. A set of three "Pyrex" glass insulators has been mounted for experimental purposes on a spur line, and so far has proved to be most satisfactory.

Transformers, such as that mounted on the road-crossing switch pole, shown in fig. 3, are of English Electric make, and fitted with oil conservator tanks. Every spur from the ring main is controlled by a pull-down switch-fuse (Switchgear & Equipment, Ltd.), protecting both the line and transformer, which is connected solid from the ring to the section switch on the first pole (fig. 2). All section switches, such as those illustrated in fig. 9, are by Standard Switchgear, Ltd. embodying line insulators instead of long jumpers and lower make-off.

Over forty miles of line has now been erected and energised, so that supplies are already available along some two-thirds of the routes schemed. Every endeavour has been made to preserve local amenities. The fact that all the wayleaves needed for some forty-five miles of overhead lines have been obtained without recourse to a single Ministry of Transport inquiry is an indication of the careful forethought which has been given to this aspect of the work.



The 11-kV overhead ring main and spurs in the Dorking area

In addition to doing constructional work, Overhead, Ltd., is also negotiating wayleaves, securing consumers, and wiring consumers' premises. The charges made for energy in this district are very favourable. Indeed, they may operate against any very substantial revenue at the outset, but they are being offered with the deliberate intention of encouraging rapid development with a future reasonable return.

Installation costs are recovered by the collection of 2d. per kWh extra for installations of from three to six points, or a quarterly charge in accordancce with a schedule for installations of from three to sixteen points. Domestic appliances are hired at the following quarterly charges:—Cookers: Jackson (51J), 4s.; Magnet (5476), 5s.; Revo ("Maxima"), 10s. Kettles: Premier ("Quickset"), 1s. 6d., or with cooker, 1s. Washboilers: (10-gallon Burco), 3s. 6d. Irons: (G.E.C., 5.5 lb.), 1s. Fires: 1-kW Berryl," 1s., and 2-kW "Magicoal," 4s. Water heaters, 3-gallon: 3s. 6d. and upwards.

In about half of the area there are already 358 consumers, 188 of whom are on the flat rate, ninety-seven on a two-part tariff, and seventy-three with slot meters. Between them they have sixty-nine cookers, fifty-nine kettles, eleven irons, five wash-boilers and eight fires. Fifty-nine consumers took advantage of the assisted wiring scheme and 198 applications for supply are in hand.

The only industrial loads in the area are that of the Buckland Tile Co. (about 15 h.p.), and 90 h.p. used for haulage and pumping by the Sand and Silica Co. on the eastern fringe of the area. It is interesting to note that the Buckland Sand & Silica Co. has adopted a sand excavating machine which works on the principle of a dredger. This is driven by a 12-h.p. motor and is believed to be the first machine of this type to be used in this country on this work. Heating and cooking are, however, being pushed actively, and very favourable energy prices are being offered. Such is the J.E.A.'s vigorous policy of development that it confidently anticipates revenue to exceed all capital charges on completion of the constructional period.

The Paris Fair

(From OUR PARIS CORRESPONDENT)

THE electrical part of this year's Paris Fair (May 13th-29th) was bigger and better than ever. I have been told that thirty-five firms had to be refused admission owing to lack of space. In spite of this, however, it was in vain that one searched for a British stand or a stand bearing a British name. Naturally, our country was represented by agents, but that is not quite the same thing. Great Britain has a name for quality, and numbers of French traders were hoping to meet Englishmen to see what they had to offer.

This year there was a marked reduction in the domestic apparatus displayed. The reasons for this are many. Two of the principal ones are that it becomes more difficult to improve vacuum cleaners, and they are now to be found in every shape and size; and secondly, the Salon des Arts Menagères has become increasingly important for the exhibition of this apparatus. Manufacturers now hold their new articles back for that show. It should not be imagined, however, that the Fair had nothing domestic to offer. Synchronous clocks were much in evidence; a good display was that of the house of Lepaute.

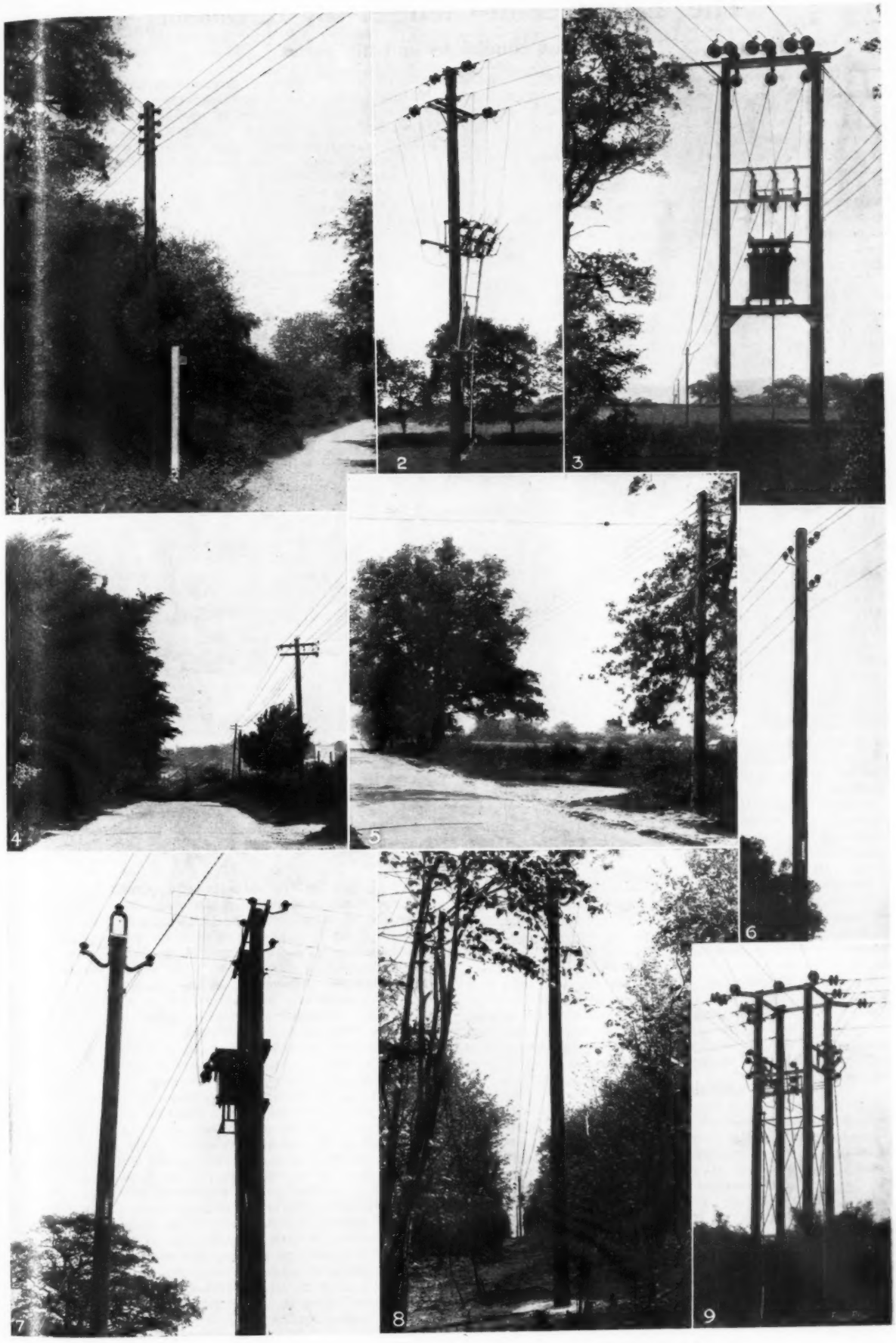
I noticed in particular a number of new lamps and methods of improved lighting. Trouvay and Cauvin have recently brought out the "Téco-Flora," which is claimed to increase the light and halve the current consumption. There are two types, extensive and intensive. The former is a direct reflection type with an exterior mirror which diffuses the light by throwing it downwards. The latter is of a semi-indirect type.

A new electric coffee pot is worthy of mention. This utensil has three separate compartments for water, coffee and the infusion. Once the water is boiled the vapour which rises can be controlled, so that any strength of coffee may be obtained. A pot for eight cups, for example, uses 600 W and weighs about 3 lb. Several electric tea-pots were also to be seen.

Left: A "Teco-Flora" fitting. Centre: Part of the Lepante synchronous clock display. Right: A "Toilectro" coffee percolator

One of the most important stands was that of the Compagnie Française des Accumulateurs Electriques Iodac. The iodine accumulator has made great headway over here, and it is gradually being developed for domestic purposes. Many advantages are claimed for this accumulator, e.g., that it is absolutely reversible, it stores a larger quantity of electricity, does not give off gases, and has indeformable electrodes. Its capacity is stated to be 25 watt-hours per kg. Among the heavier apparatus it was noticed that centrifugal pumps are being produced on a much smaller scale, and are being employed domestically to a far greater extent.

Brandt and Fouilleret had an interesting display of "*contacteurs-disjoncteurs.*" These are generally made with from one to four poles with a normal rating of 30 A. The A.E.G. showed its electric fan with elastic fabric blades. This fan does not need a guard; it has a 32-W motor and weighs 3.3 lb.



The Dorking System of the London & Home Counties J.E.A.

1. A neat three-way distributor with aerial fuses. 2. A ring main spur controlled by pull-down switch-fuse. 3. A road-crossing transformer pole. 4. Hidden power lines at Box Hill (left) with a conspicuous G.P.O. line on the right. 5. A typical low-voltage distributor. 6. A light-type village line. 7. A light-line 11-kV take-off. 8. An 11-kV line crossing Box Hill. 9. A three-way switch pole

The Engineer-in-Charge. By H. Dubbury

Present conditions and his duties

THE maintenance of an efficient power supply is one of the principal functions of the factory engineer, and any negotiations with local supply authorities or suppliers of power plant should be carried out through him. Where steam is an essential in process work, electricity can be generated much more cheaply than it can be bought. I am not an advocate of coal in a factory—where it can be avoided—as it is usually accompanied by so many miseries, *i.e.*, dirt, wasted space, off-loading charges, and what not. In most districts there is no reason why a factory not using steam in process work should not efficiently generate its own current. The Diesel-type of engine can easily compete with most supply undertakings.

The principal advantage of taking a supply from the public mains is the saving in space obtained, as the transforming arrangements can usually be housed unobtrusively. The decision as to the right plant to use should rest with the factory engineer, as he alone has the necessary experience to approach this matter without bias.

The distribution of steam service pipes throughout the factory is a question that should be studied periodically. It is usually difficult to foresee the ultimate lay-out of a factory, and in consequence various pieces of plant are added and the pipes coupled up to the nearest supply; this continues until there is a complaint of low pressure, when the whole distribution is reviewed and much money spent, some of which might have been saved if the extensions to the system had been made in a different manner at the commencement.

Mr. H. Dubbury

The Care of Production Plant

I suggest that in all cases the management should place a draughtsman at the disposal of the engineer; this practice will prevent their secrets getting outside the works, and will also save much money in lay-out expenses, because if the engineer spends his time in the drawing office he neglects supervision. The work of maintaining and keeping in good running order all production machinery is the responsibility of the factory engineer, and it should be his prerogative to demand the laying off of any section of a plant for repair or overhaul.

In some factories this duty is handed over to the tool-room foreman. Thus we find machines being repaired by tool makers at vastly higher rates than are necessary. In no case need the factory engineer employ personnel other than millwrights and machine fitters for this work.

Because some of the service plant—such as lifts, hoisting gear and boilers—is covered by insurance there is a tendency to consider that action need be taken only on the initiative of the inspector. The best practice from my experience is to put the inspection and maintenance of service plant in the hands of the makers, who can then be held responsible for the condition of the plant; this relieves the management of a good deal of responsibility at a very small cost.

Supervision of the cleaning and sweeping of the factory is one of the most important duties of the engineer. Painting a building, whether inside or outside, has a stimulating effect on the employés and increases production.

Electrical Maintenance

Constant vigilance is required to see that all Home Office rules are observed in electrical maintenance. It is assumed by many employers that because motors are idle, no attention is necessary. As a consequence, when the motor is started, trouble is experienced through dirt, gummed-up bearings, &c.; many a good armature has been burnt out through this neglect. A good factory engineer will see that all idle motors are blown out at regular intervals and turned round or, if possible, run up for a minute or so.

I have usually found that unless the shops are being used for the same purpose as they were erected the lighting is hopelessly wrong. The original general lighting having been found inadequate for the new lay-out, individual lights are added, with chaotic results. It is much cheaper in the long run to re-wire the shop.

Too often the mechanical designer of plant tucks the motors away so that the machines as a whole may look compact, forgetting the subsequent trouble that may arise through difficulty of cleaning and attending to the motors. Where small extensions have been added from time to time a considerable amount of power may be used through the gradual installation of electric heaters, no provision having been made when planning the extension to extend the main heating system.

It is quite simple to form an efficient fire brigade by training a few men picked from various parts in the factory. All employés are instructed on an outbreak of fire to telephone to the works exchange the words "Fire in ——"; the operator immediately switches over to various points by means of a special fire switch, and repeats the message, which is passed on to the selected employés in the vicinity. The men immediately drop their work and go to the seat of the fire, picking up on their way axes, extincteurs, or other pieces of apparatus according to their individual instructions. This system is used, to my knowledge, in quite a number of factories, and is highly efficient.

Traffic Control

Owing to rapid development factories may grow out of all proportion to their entrances and the portion of the property set aside for roadways and raw material and merchandise handling is consequently in a constant state of traffic jam. The factory engineer's duty is to regulate all matters appertaining to traffic and to eliminate risks that may lead to injury and waste of time by carmen and drivers awaiting their opportunity to get through.

Floors, however constructed, need constant supervision, the roofs should be attended to as soon as a defect develops, and cracks in walls, due to slight subsidence, should be surveyed and repaired. It is this part of a factory engineer's work that brings out—as much as anything—his most valuable asset, a "sense of proportion." The art of building maintenance is to do only the work that is necessary, but to see that it is done immediately.

Home Office regulations call for an efficient and competent person to be in charge of all safety arrangements in a factory, such as machine guarding and lighting, proper attention to belting and main shafts, and the hundred and one things that come under the heading of "safety in factories." Too often the management, when passing through bad times, dispenses with factory engineers and cuts the maintenance to such an extent as to endanger the safety of employés. If in times of prosperity a factory engineer is a necessity, he is even more so in slack times when redundant machines should be scrapped and their spaces made ready for new machines.

Letting Out Maintenance Contracts

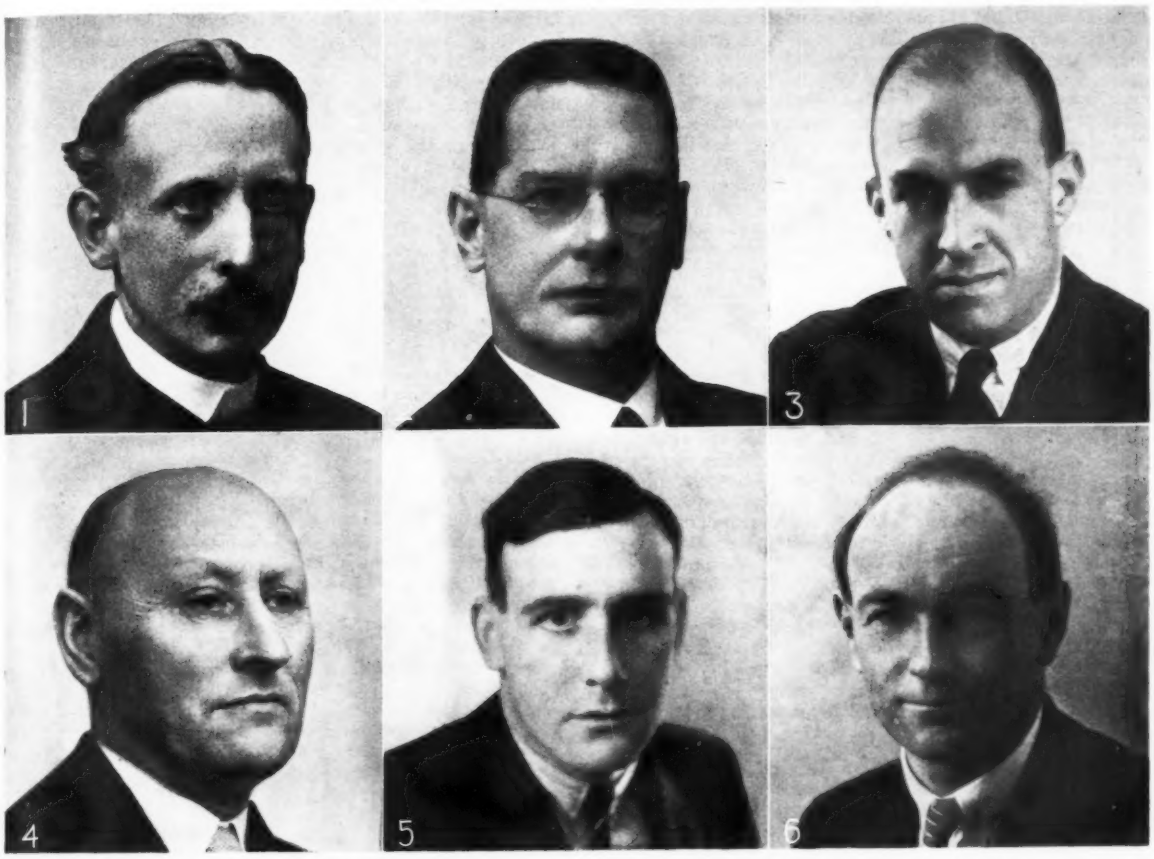
If the maintenance staff is kept down to a minimum, as it should be, slack times should make very little difference to their duties in cleaning, watching, power generating and general servicing of the plant. Employers often consider it cheaper to employ direct labour than put any work to contract, with the consequence that the personnel of the factory engineer is constantly fluctuating. Let them try giving more work out to contractors, whose overhead charges are much less than those in the factory, and they will probably find that they have secured a better job at a lower cost. Piecework rates for maintenance are paid in a few factories, but the system can be subject to grave abuse.

It is the general practice to collect various foremen—millwright, power plant, electrician, building department, cleaning and servicing department and drawing office—at, say, 10 a.m. to go through the day's work; why not try 5 p.m.? It is then reasonably easy to pick up any item and see if the work is there for the next day; if the foremen are checked in this way, they will not be anxious to carry more personnel than is necessary, for trying to invent jobs that do not exist is a soul-destroying task. Many a time a foreman or section hand is forced to the conclusion that he can only keep his prestige by supervising as many individuals as possible. Too often has he seen a conscientious man reduce his personnel by hard work and good supervision, only to receive as his reward a reduction in salary or prestige, or, in some cases, to lose his job altogether.

At the present time I consider there is too much experimenting with the maintenance staff. Employers are always shooting this department to pieces in the hope that they will save money, but they invariably come back to facts. They find that there is only one way to run a maintenance staff economically, and that is by giving a fully qualified factory engineer the necessary authority.

Some Driving Forces in the Industry

Wild-Barfield Electric Furnaces, Ltd.



1. Mr. L. W. Wild, M.I.E.E. (*Russell & Sons*), physicist. 2. Mr. E. P. Barfield (*Russell & Sons*), managing director. 3. Mr. G. R. Barclay (*Mannell*), director and secretary. 4. Mr. J. P. D. Coleman, works director. 5. Mr. J. E. Oram, sales director. 6. Mr. G. Grene (*Lambert & Jackson*), chief designer.

A Battery Charging Problem. By R. Wheatley Minter

Ascertaining the correct resistance to be employed

THERE is a problem with regard to charging high-voltage batteries, or large numbers of cells in series, when the currents have to be limited by lamps and the rates derived by calculation, which merits the attention of those who have batteries in their care.

In the first place it must be remembered that an accumulator voltage is only nominally at 2 V per cell. On discharge the e.m.f. of the cells begins at that figure and falls as the discharge proceeds to as low as 1.8 V per cell. Then on charge the voltage rises to from about 2.2 to 2.7 V per cell. If, therefore, it is required to charge a 160-V battery of eighty cells, each capable of generating an e.m.f. on charge of 2.65 V, the maximum back pressure will be $80\times2.65=212$ V, and consequently this battery cannot be charged as one unit from 200-V mains. If, on the other hand, it were to be divided into two units of forty cells each, the approximate back pressure would be 106 V and charging could proceed.

Variation of Lamp Resistance

In such circumstances a convenient method of limiting current flow is to insert metal-filament lamps in series with the cells and the mains. Current calculation is not, however, straightforward, because the lamps have a variable resistance at different pressures. In the example chosen above, only half the full mains supply is available for the lamp, so the current which would flow would not be that estimated from simple calculations from Ohm's law. The variation in procedure in calculating the current passed is as follows:—

Assuming that a lamp is operating at full pressure of 200 V and is rated at 50 W, it passes 0.25 A and its resistance must be 800 ohms. When, however, the lamp is in series with accumulators having a back pressure of between $40\times2=80$ V and $40\times2.65=106$ V, the lamp is only operating at 120 and 94 V respectively. Consequently the resistance of the lamp will have changed and its variation for practical purposes may be considered to be 2.5 per cent. change of resistance for every 5 per cent. change of voltage below normal. Thus, since the voltages applied to the lamp have become 60 and 47 per cent. of normal, respectively, the lamp resistances are now 80 and 74 per cent. below normal and the currents passed are (*a*) $120/800\times80/100=0.1875$ A and (*b*) $94/800\times74/100=0.1588$ A respectively (an average drop of about 30 per cent.).

Thus, apart from the bad effect produced by running lamps at low voltages, to do so is misleading unless the above calculation is carried out. If, on the other hand, 100-V lamps were used in cases such as this, they would be running at their normal pressure and current calculations could be carried out from considerations of wattage ratings in the usual way. Conversely, it may be required to ascertain what would be the proper wattage of a lamp to use when charging a bank of cells at a predetermined rate. In the case of a 60-V battery charging from 220-V mains we must proceed as follows:—Thirty cells at 2 V=60 V and $30\times2.65=79.5$ V. Then 220 V−60=160 V per lamp and 220−80=140 V, so that the charging rate is 0.2 A. The resistance required is between $160/0.2=800$ and $140/0.2=700$ respectively; say, 750 ohms. The proportion of line voltage per lamp is $160\times100/220=72.72$ and $140\times100/220=63.63$ per cent., which, by the resistance change calculation indicated above, gives an average of 16 per cent. change in resistance from normal at the lower pressure during the charge. Hence, 100 per cent. resistance at this lower pressure and changed conditions would be $750\times100/84=893$ ohms. Then, assumed lamp current at full pressure is $220/893=0.25$ A approximately; consequently the watts to be dissipated amount to $0.25\times220=55$ W.

Thus, instead of the 44 W which would have been obtained by calculating the wattage dissipation at full pressure and 100 per cent. resistance of the lamp, there is an increase of 11 W obtained by consideration of the other factors indicated, an addition of 25 per cent.

The Preparation of Brewing Water. By R. Leonhardt

A PARTICULARLY undesirable impurity in waters intended for brewing is magnesium salts, which are frequently found in a form which affects the intestines; also these salts make it impracticable to add the large proportion of hops necessary for the production of popular light-coloured beers of the Pilsner type.

No economically practicable means has hitherto been developed of overcoming this objection, but an electro-osmotic process is expected with a few improvements to offer a feasible method. This process removes the deleterious elements, such as the bitter salts, without affecting the useful characteristics of the water. It is based on the principle that an electric current applied to a liquid causes the formation of electrically charged particles (ions) which are attracted towards the electrodes of the current supply.

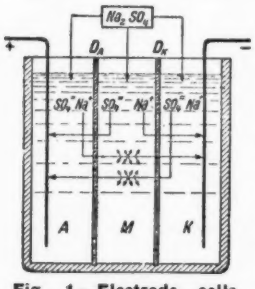


Fig. 1.—Electrode cells rinsed by running water

A—anode. K—cathode. M—central cell. DA DK—diaphragms

If porous diaphragms are interposed in front of the electrodes (fig. 1) the impurities separated can be prevented from mixing with the water again. The fixing of these diaphragms sets up what is in effect a three-cell system; the impurities are directed towards the electrode cells, whilst the water in the central cell progressively loses its salts content. Impurities that accumulate in the electrode cells must be removed by rinsing them in running water. To achieve a more thorough purification, several of these three-cell systems are arranged in sequence, the water to be purified passing through their central cells successively.

In the first apparatus used several systems were put together after the manner of a filter-press, the water being transferred

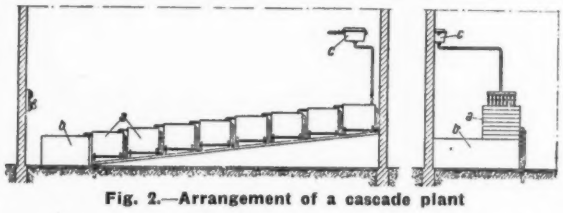


Fig. 2.—Arrangement of a cascade plant

from one central cell to the next by siphons. This method requires the use of water that has already been de-salted for the rinsing of the electrode cells in the last system of the series, in order to render the slight exchange of water through the diaphragms free from undesirable effects. Filter-press apparatus of this kind is available in capacities ranging from 4 to 200 litres. According to the speed at which the flow is set, they will supply water that is more or less completely de-salted, but their output is so small that it is inadequate for brewery purposes.

To deal with larger volumes of water, it was found necessary in the first place to modify the design so as to dispense with the siphons connecting the central cells. This was done by turning the cells round through an angle of 90 deg., so that the central cells should be next to each other, and by arranging them in steps (fig. 2). The water then overflows from one central cell into the next. Large concrete vats, suitably impregnated, each with sixteen permanently fitted earthenware diaphragms, are used for this purpose (fig. 3). This gives seventeen cells, eight of which are central cells, the others being electrode cells. Earthenware diaphragms will not remove salts from the water so thoroughly as will the textile diaphragms used in the filter-press apparatus, but they do remove the magnesium salts, and they are easily cleaned with water and a brush.

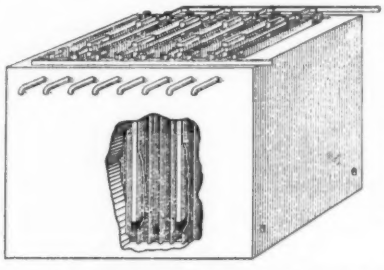


Fig. 3.—Concrete vat for cascade plant

The rinsing of the electrode cells, which would call for a special arrangement of pipes, is avoided by maintaining the water in the central cells at a somewhat higher level, so that none of the water that is charged with impurities can reach them (fig. 4). On the other hand a certain amount of water flows constantly into the electrode cells, and out again over the sills, carrying with it an excess of salts. With a cascade plant worked continuously it is possible to purify about 100 hectolitres of water per day. If larger quantities are required, several cascade units can be run in parallel. Direct current at 110 or 220 V is required, and the consumption is about 2 kWh per hectolitre. This consumption will not be regarded as a serious tax, as there is scarcely any other satisfactory means of preparing suitable water for brewing purposes. There are indeed some waters that do not lend themselves to any other method of removing the undesirable ingredients.

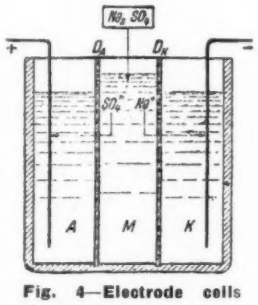


Fig. 4—Electrode cells rinsed by water from central cell

The method described has already yielded some very interesting experience. In one case the water before purification contained 125 milligrammes of MgO per litre; after electro-osmotic treatment this was reduced to one-tenth of that figure. In every instance the brews made with osmotised waters yielded far more agreeably tasting beer.

Electric Cooking on the Continent

ELECTRIC cooking has made substantial advances in almost every Continental country during recent years, says F. Mörtzsch in *Elektrotechnische Zeitschrift*. Most of the electricity supply authorities in Germany offer energy for cooking purposes at 8-10 pf. per kWh (say, 0.96-1.2d. at par) and the following data, based on information supplied by members of the German Association of Electricity Works, show that the number of domestic cookers (with oven and two or more hotplates) has more than doubled in a year.

	Number in		Increase per cent.	Mean connected kW per appliance.
	1930.	1931.		
Two-plate table-cookers ...	14,183	21,565	52	2.3
Ranges (oven and hot plates)	17,259	36,140	110	4.9
Lagged-cover table-cookers	13,711	18,259	33	0.85
Total	45,153	75,964	68	—

This satisfactory rate of development has been encouraged by instalment-purchase schemes, demonstrations, and by improvements in construction, which have reduced the capital cost and increased the reliability of cooking appliances. Besides the many cookers installed in provincial towns and districts served by transmission lines, electric cooking apparatus has been installed in many settlements in large cities.

The number of hot-water storage installations in Germany increased from 29,521 in 1930 to 41,931 in 1931, an increase of 42 per cent., the average connected load being 0.98 kW each. In the case of a certain large supply system in Central Germany, the distribution of storage plants by number, and the average capacity of each in gallons (in parenthesis), were as follows: domestic, 36 per cent. (12¼ gal.); hotels, 32 per cent. (14¼ gal.); doctors, 9.6 per cent. (11¾ gal.); butchers, hairdressers, miscellaneous trades, 6 per cent. each (10¼ to 12½ gal.). The progress in this direction has been accelerated by hiring schemes and by contract tariffs for the supply of energy, chiefly at night. Recently there has also been an increase in the number of smaller storage heaters, of 1-1¾ gal. capacity, mainly used during the day.

The number of large electric cooking equipments in German hotels, sanatoria, restaurants, casinos, and similar establishments increased from 379 in 1930 to 491 in 1931 (30 per cent. increase), the connected load in 1931 being about 28,000 kW, or an average of 57 kW per equipment. During the last year or two there has been a great increase in the number of homes and institutions employing large ranges of this type.

In Switzerland

The extension of electric cooking and hot-water storage in Switzerland since the war has been very rapid, due largely to the dependence of that country on imported fuel and to the abundance of native water power. According to a graph

reproduced by Herr Mörtzsch, the numbers of cookers and storage installations have risen approximately as follows :-

Year.	No. of cookers.	No. of hot water systems.
1921	63,000	10,000
1925	84,000	30,000
1930	140,000	85,000
1931	172,600	122,200

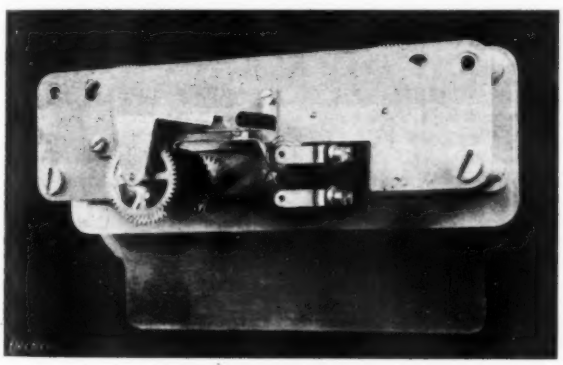
In 1931, about 18 per cent. of all domestic cookers in Switzerland were operated electrically, and 43 per cent. of the new cookers installed in that year were electric. The average connected load per range rose from 2.1 kW in 1920 to 4.1 kW in 1930 and 4.5 kW in 1931. About 13 per cent. of all Swiss households had electric hot-water storage in 1931, and the average connected load rose from 0.32 kW in 1923 to 1.18 kW in 1930. The use of large electric ranges has increased rapidly during recent years; and, in 1931, there were 636 such ranges, representing a connected load of 23,000 kW.

Less specific data are available concerning electric cooking in Scandinavian countries, but it is estimated that about 250,000 domestic cookers were in use in Norway in 1930. In some Norwegian cities electric cooking is used by the majority of inhabitants and about 60 per cent. of the total kWh sold by the Stavanger electricity works, or about 1,000 kWh per head of population, is used for electric heating and cooking. In Sweden, electric cooking is used by more than 50 per cent. of all households in Kiruna, Melmborget, Boden, and other places, and by 70 per cent. of the households in some of the suburbs of Stockholm. In Denmark, at the beginning of last year, there were about 1,000 electric hot-water storage installations in use (mostly of 6½-gal. capacity); and about 3,000 electric cookers.

In Holland about 2,500 electric cookers were in use early in 1932, mostly in the supply area of the N.V. Provinciale Geldersche Electriciteits Mj.; and electric hot-water storage was very popular, there being 16,000 installations in Amsterdam and over 12,000 in The Hague. Their capacities range up to 44 gal., but 73 per cent. are of 6½-gal., and 14 per cent. of 11-gal. capacity. In Austria, there were about 1,500 electric ovens and 500 table cookers, in June, 1932, these figures including twenty-two large ranges of 700-kW connected capacity. There were also about 1,500 users of electric hot-water storage. Electric cooking is said to be making good progress in Italy, but the author is unaware of statistics on the subject. Many " economy cookers " of the hot-plate and lagged-cover types, utilising stored heat on the hay-box principle, are in use in Alsace-Lorraine; and rapid progress has been made in the use of hot-water storage in Paris, the number increasing from about 1,700 in 1930 to 3,017 in December, 1931, with a connected load of 4,443 kW and a total capacity of 83,150 gal. (average nearly 28 gal.).

Special Duty Metering Equipment

THE combination of balanced thrust meter, summator with ten-revolution maximum demand indicator and four-figure printometer demand recorder developed by Messrs. Ferranti, Ltd., for the Central Electricity Board's kWh and reactive kVAh metering requirements is sometimes too elaborate and too expensive for smaller installations, and the company has now introduced a type of equipment which is less complex and can more readily be applied to existing installations.



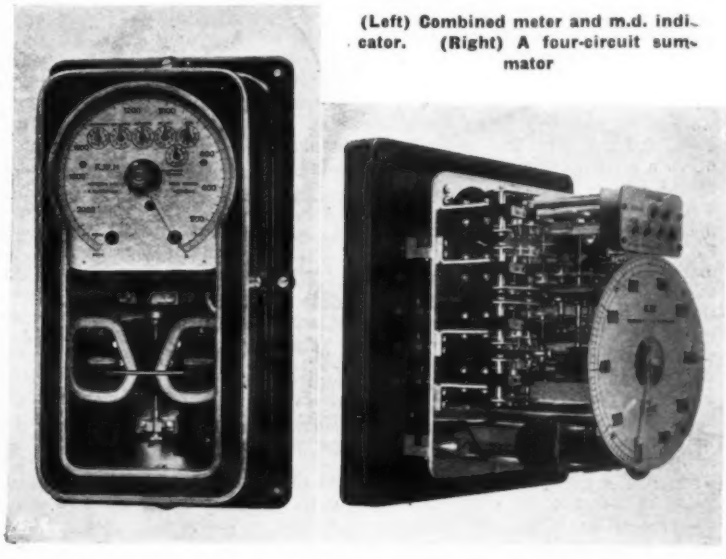
The single-way contactor

In the simplest case, where kW maximum demand and kWh indication are required, an ordinary single-phase, polyphase or d.c. meter can be fitted with a single-way contactor which transmits impulses to a maximum demand indicator by means of a separate connection to the supply. The contactor is operated by the main spindle of the meter through gearing arranged to suit the required rate of impulse transmission. The maximum demand indicator is fitted in an 8-in. dial switchboard instrument case, which can be provided with back or front terminals. The scale is unusually long and clear.

The large following pointer indicates the maximum kW demand in the circuit, an external time switch resetting the small driving pointer to zero at predetermined intervals, usually each half-hour. In the near future, this indicator will be available with self-contained time control. The maximum-demand pointer can be reset by means of the knob in the centre of the glass. Depressing the knob engages it with the pointer, which can be turned back to the zero position. Normally the knob is held away from the pointer by a spring and it can be sealed in that position. Two pilot wires of small cross-sectional area connect the meter and the demand indicator and the latter can be mounted either adjacent to the meter or at some point remote from it. Another advantage of this method is that existing kWh meters can readily be fitted with contacts for maximum demand indicator operation, thus obviating the necessity for replacing meters already installed when a maximum demand tariff is introduced.

Where a number of circuits are to be grouped for kWh and maximum-demand summation, a summator can be supplied operated from single-way contacts fitted to standard a.c. or d.c. meters. The large, single-revolution impulse-type maximum-demand indicator previously described is employed and a system of differentials sums the four circuits connected to the summator on the maximum demand indicator and kWh dials. Normally the maximum-demand indicator is controlled by an external time switch, but self-contained time control will be available in the near future.

For a.c. supplies where space considerations do not permit the use of a demand indicator separate from the meter, a combined meter and maximum demand indicator may be employed. This is a balanced thrust meter with a magnetically suspended rotor which has been designed to meet the fine accuracy and performance stability requirements of the Central Electricity's Board's metering schemes. It can be used for single-phase or three-phase circuits with commercial or sub-standard accuracy. An exceptionally clear maximum demand indicator of the externally controlled Merz type is fitted, having a scale of 13 in., which is unusually long for this type of indicator. For the control of the demand indicator, an electrically wound time switch is employed. By bringing the meter elements out to separate terminals it is possible to use this meter to group two circuits, both with regard to kWh and maximum demand; where one circuit may be alive and the other dead, alternately, a potential selector relay must be provided to ensure that the pressure elements of the meter will always be connected to the live circuit.



(Left) Combined meter and m.d. indicator. (Right) A four-circuit summator

Electrical Amusements

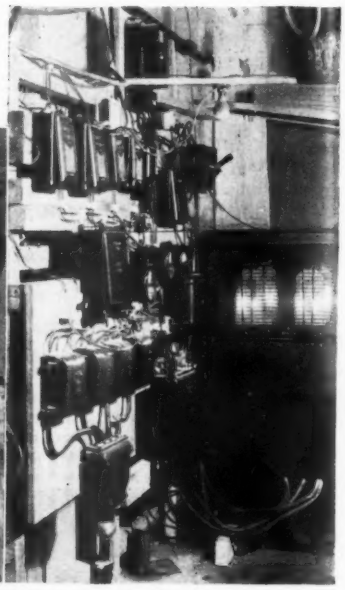
THE amusement of the public is becoming a highly technical matter, and proprietors of "fun fairs" have been quick to appreciate the advantages of electric light and power. At Brighton, for instance, inquiries have revealed the large part which electricity plays in "Aladdin's Cave" (where most of the amusements are centred), which this year has been considerably extended and improved.

For some years past the heavy and noisy electrically driven "Dodge 'em" cars, with their terrific bumping and head-on collisions, have been a very popular feature. There are two other such tracks in the town, but the one in the "Cave" provides for twenty-four cars, which are driven by 0.75-h.p. motors at 1,750 r.p.m., and the current comes from large transformers which step down from 460 to 115 V. The lighting of the track is carried out with 6-kW of lamps. At times the load is tremendous, particularly when there is a "jam," and the attendants have a hectic time separating the cars.

The newest and largest show in the "Cave" was opened for the first time on April 15th, when the longest motor boating pool of its kind in the country was formally inaugurated by Coun. W. Steers, Chairman of the Aquarium Committee. A long disused part of the "Cave" has been utilised for a 180-ft. long pool filled with fresh water in which four tons of salt has been dissolved. On this thirty boats are propelled by electric motors. Contrary to past practice, the power does not come from the overhead wire netting earthed to the water—the process is reversed, the wire netting being the negative pole; the system is thus made safer than ever. One can stand round the pool and place one's hand on the netting and feel nothing. The boats themselves are of interest. They cannot be capsized, and the motors are fitted like "in-board" petrol engines for small boats. Forward and reverse movements are made merely by giving the steering wheel a complete turn.

The electrical apparatus is larger than one would suspect. A three-phase Partridge Wilson rectifier and transformer convert 400 V a.c. to 100 V d.c., there being two valves to each phase. Each boat is fitted with a 6.25-h.p. motor running at 1,200 r.p.m., and the speed of the boats is from 6 m.p.h. upwards. The pool is illuminated by twenty-eight 300-W lamps.

Then there is the electrically driven "Ghost Train," and an ingeniously arranged track for six "Brooklands" motor cars on a miniature scale provides a few seconds' thrill as the tiny cars, about 3 in. long, simply whizz round a double eight track on a centre rail each. The well-known race game called "All Press," with its four dials illuminating the names of horses, is another electrical contrivance.



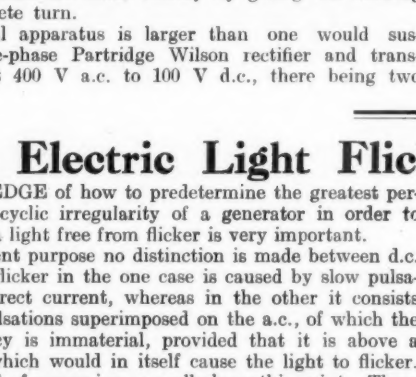
An electric boating pool and the switchgear controlling electrical amusements and lighting at "Aladdin's Cave," Brighton

On the Palace Pier there are remarkable electrical games based on greyhound racing, steering a model motor car into a garage by means of a wheel fitted at a distance, the "Spider and the Fly" game, and others, all very intricate. This provides another illustration of the way in which electricity is penetrating into every phase of human activity.

Electric Light Flicker. By A. Skowron, B.Sc.

A KNOWLEDGE of how to predetermine the greatest permissible cyclic irregularity of a generator in order to produce a light free from flicker is very important.

For the present purpose no distinction is made between d.c. and a.c. The flicker in the one case is caused by slow pulsations of the direct current, whereas in the other it consists of the same pulsations superimposed on the a.c., of which the actual frequency is immaterial, provided that it is above a certain value which would in itself cause the light to flicker. The usual supply frequencies are well above this point. These pulsations are due to the inherent cyclic irregularity of the various reciprocating prime-mover, such as Diesel engines, steam engines, etc. The cyclic irregularity must be reduced below a certain value if the pulsations produced by it are not to be noticeable as flicker. Unfortunately this value varies with the number of cylinders and with the number of working cycles per revolution of the engine. It is furthermore a function of the speed. It is thus apparent that the required value is different for every individual case, and the only common factor is that the presence or absence of flicker is finally judged by the visual impression of the eye.



The human eye is most sensitive to light variations occurring at a frequency of about 7 per sec. At a faster rate the inertia of the eye comes into play, tending to even out the flicker, while when the frequency is lower, the eye continually accommodates itself to the instantaneous illumination, so that the variations in brightness are less noticeable. It follows, therefore, that the cyclic irregularity of the prime-mover must be at its lowest when the pulsations occur at the rate of 7 per sec., and that it can be allowed to assume higher values as the frequency of the pulsations increases or decreases. A curve of maximum permissible cyclic irregularity plotted against pulsations per sec. passes through its minimum when the frequency of the latter is 7 per sec.

For a single-cylinder, two-stroke internal-combustion engine, experience has shown that if the permissible cyclic irregularity for a given speed exceeds that shown in the figure, flicker will result. The minimum occurs at 420 ignitions or pulsations per minute or 7 per sec. The same curve holds good for a two-cylinder four-stroke engine, because the number of ignitions per r.p.m. is the same. It is therefore more convenient to use the number of ignitions or pulsations per min. as the base of the graph in preference to the number of r.p.m., as in this case a single curve will serve for various numbers of cylinders, speeds, etc. The number of pulsations per minute for a two-stroke, single-acting engine is $P = Xr$, and for a four-stroke, single-acting engine $P = Xr/2$ where r = r.p.m., X = number of cylinders, and P = number of pulsations per min.

For double-acting engines, such as steam engines, the above values are doubled.

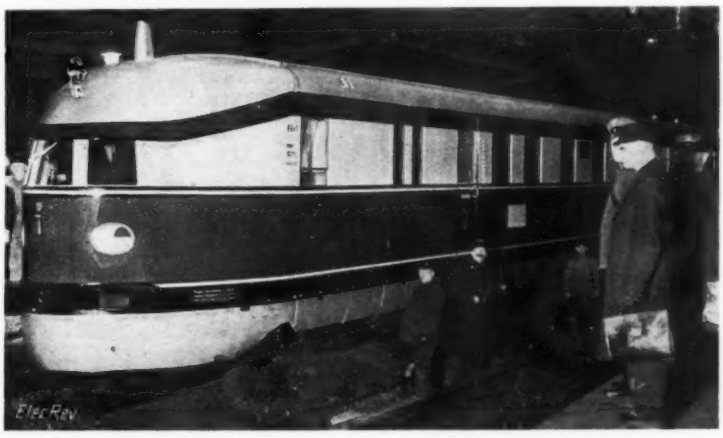
Examples:—What is the maximum permissible cyclic irregularity for a four-cylinder four-stroke Diesel engine at 300 r.p.m., in order to produce a light free from flicker? The number of pulsations per min. is $4 \times 300/2 = 600$, and against this figure the curve shows the answer as 1/160.

Two or more d.c. sets can be run in parallel as long as each set fulfils the above conditions in order to give a light free from flicker. While, however, the same values of cyclic variations hold for a.c. sets in parallel, they merely represent the very least fly-wheel effect that must be embodied, and only guarantee light free from flicker, but not necessarily suitability for keeping in step. In order to ensure the latter, the fly-wheel effect generally requires to be augmented.

A German Diesel-electric System

The Reichsbahn's new high-speed coach

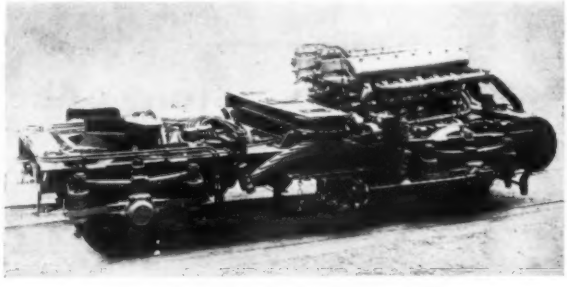
THE " Flying Hamburger " of the German Reichsbahn is a Diesel-electric coach accommodating 102 passengers and capable of maintaining a maximum speed of 100 m.p.h. under favourable conditions. On its trials the coach repeatedly completed the 180 miles between Berlin and Hamburg in 140 minutes, and it was placed in regular service on May 15th, working to a schedule speed of 77 m.p.h. The coach is in two parts, carried by a four-wheeled bogie near each end and a Jakobs bogie at the centre, the two halves resting on concentric spherical seatings on the central bogie. This articulated construction is necessitated by the length of the vehicle, about 138 ft. overall. The body is streamlined, and, for lightness, extensive use is made of welded steel construction with plywood linings; the total weight, with three tons of fuel oil, is about 76¼ tons, excluding passengers.



The " Flying Hamburger " at the Lehrter Station, Berlin

Two Diesel-electric sets are employed on each end bogie, and the coach is driven by two electric motors, nose-suspended and geared respectively (1 : 2.62) by the two axles of the centre bogie. The Diesels are Maybach twelve-cylinder vee-motors, rated at 405 h.p., 1,400 r.p.m., continuous output, and consuming 0.4 lb. oil per h.p.-hr. at the most economical load. The generators are d.c. machines driven through flexible couplings, each supplying only one of the traction motors, either of which is capable of driving the coach at reduced speed (75-80 m.p.h.) from either end (it is too long to go on turntables). The electrical equipment of the new coach was supplied by the Siemens Schuckertwerke concern, of Berlin, and it embodies the Gebus system of control (described below) for the main motors.

The engines are started by running the generators as motors from a 96-V battery: electromagnetically operated levers on the governors enable either engine to be stopped from either cab. The power output is regulated by adjusting the engine speed, electric servo-motors under the driver's control altering the setting of the governor springs. The engines stop automatically if the pressure of the lubricating oil should fail for any reason. The only engine-control instruments in the cabs are revolution indicators and transmitting thermometers showing the temperature of the cooling water. In addition, there are starting and stopping switches for the engine; ammeters and voltmeters in the main motor circuits; air and hand brake controls; a train-speed indicator; press buttons for sanding and for cab-to-cab signalling; cab-signalling and train-control apparatus operated inductively from the track; and two controller drums, one varying the engine speed (light and six running notches), the other with off, start, forward, reverse, and brake-pump positions



The two 410-h.p. Maybach engines

The Gebus Control System

With unimportant exceptions, the electrical equipment is the same in both halves of the coach. The main circuits system of connections was recently described in a paper by Dr. F. Fuchs and M. Breuer in *Zeitschrift des Vereines deutscher Ingenieure*, whence these particulars are derived. The Gebus system of control greatly simplifies the driver's duties. Each of the main generators has a self-excited shunt winding, and a series field coil. Supply for lighting and control, battery charging and auxiliary pumps, is taken from an auxiliary generator.

The main generators work with low flux density, and the windings are designed so that the current-voltage curve corresponds closely to the power hyperbola of the engine over the working range from maximum tractive effort to maximum speed. The generators do not excite at the light-load speed (750 r.p.m.) of the Diesels; hence the traction motors then receive no current. The motor current depends on the tractive resistance, and the current and voltage adjust themselves automatically so that their product corresponds to the Diesel output, the latter being regulated by altering the engine speed.

The only switchgear between each generator and motor is a reversing switch; the speed of the engines is regulated by a light-current switch controlling the governor-spring servo-motors. Each speed corresponds to a definite engine output. At maximum speed the generators absorb the full power. If maximum power is not required the engine speed must be decreased, thus reducing the wear. The driver's engine-speed control determines the engine output, which remains practically constant over the whole range of train speeds corresponding to that output. The range of generator speeds is approximately from 1,100 r.p.m. (fully excited but quite light load) to 1,400 r.p.m. (full load).

Speed Adjustment

For a given speed, and therefore power, setting of the Diesels, the generators deliver heavy current at low voltage as the coach starts; the current decreases as the motors accelerate, and the tendency for the load on the engines to decrease results in a rapid rise of generator voltage.

The main contactors open the generator-motor circuit when emergency braking is applied, when the main air pump is to be operated with the generator at light-load speed, or when the engines are to be tested alone. A special contactor short-circuits the field in emergency. An adjustable resistance in the shunt-field circuit enables the power absorbed by the generator to be adjusted once for all to the Diesel output. Most of this resistance is in the form of heating elements in water heaters in the refreshment car. The electrical machines are protected by fuses with matched thermal characteristics. The starting contactor, operated by the driver's starting switch, connects the battery to the generators for starting the Diesels, the main contactor meanwhile being open.

The lighting circuits of each half-coach are supplied, at 48 V, by an auxiliary generator in conjunction with half the 96-V battery. The auxiliary generators commence charging the battery at the light-running speed (750 r.p.m.). In order to prevent freezing of the circulating water when the coach is standing in the running sheds, 3½-kW electric heaters are fitted in the circulating system.

The fully laden coach must be brought to rest from full speed within 1,300 yards, the distance between distant and home signals. Cast-steel brake drums are fitted inside each wheel in the end bodies, and outside each wheel in the centre bogie; two large brake blocks, with friction linings, act on each drum. In addition, there are four emergency track-brake magnets in each end bogie and two in the centre bogie.

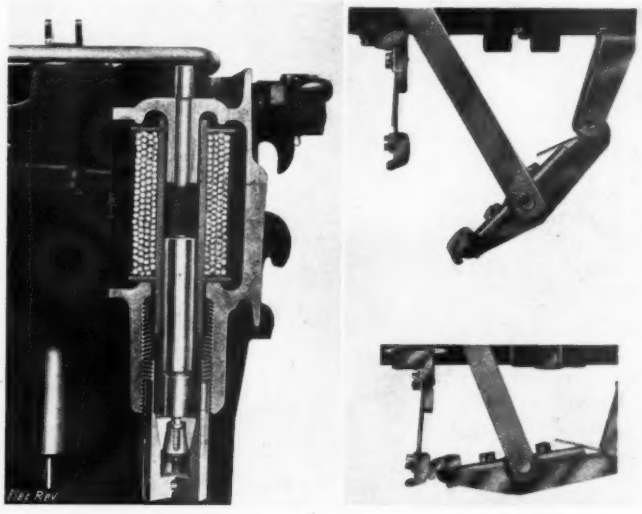
The train-control system, developed by the Reichsbahn in conjunction with the Vereinigte Eisenbahn Signalwerke G.m.b.H. and the C. Lorenz A.G., uses magnets attached to the side of the coach and excited from three a.c. circuits with relays tuned to definite frequencies. According to the setting of the signals, track magnets react with the coach magnets to operate one or other of the relays, thus enforcing speed reduction or applying emergency braking as required

Points in Switchgear Production

Making parts for stock

IN the Birmingham works of Messrs. George Ellison, Ltd., are over 11,000 component parts made to stock orders, each requiring one or more jigs and special tools. Semi-finished stock is carried to the limit pending customers' instructions as to the fitting of special coils, meters, &c., with the result that delivery of a switch unit can be effected in a few hours and a complete switchboard can be made up in a few days.

In nearly all cases the busbars, heavy switch contacts, and other current-carrying parts are mounted on two "Tufnol" round rods in preference to one square support. Extruded metal in a large variety of shapes is used extensively for contacts, clamps, &c., and wherever such metal is sawn the edges are machined to prevent them from cutting into the insulation. The company regards the prominent Ellison switch-off knob as of the utmost importance in that quick and easy stopping is essential. All ferrous metal components are sherardised, and the concern attaches particular importance to making the whole gear weatherproof. Evidently frequency standardisation is already felt, for the company's representatives told us that by reason of the greatly reduced variety of sizes they are now able to stock no-volt coils, and that the production cost of this item has been reduced considerably.



Left: Sectional view of a standard Ellison overload time-lag release. Right: Wiping contacts of breaker open and closed

An example of precision working and finish is afforded by the production of the stamped release hook and hold-on catch (trigger) for the operating mechanism. We refer to broaching, resulting in the most vital part of the mechanism being interchangeable and needing no adjustment. Overload protection is of outstanding importance to the company, and Messrs. Ellison are endeavouring to impress this fact upon production engineers.

Faith in the time-lag solenoid is clearly expressed in the design and construction. The device has a triple action restraining the solenoid plunger during the current rush upon switching on, acting as a retarder on normal over-loads, and quickly resetting itself after release. The conical piston sits on a shoulder in the oil bucket, and has two parts separated by a spring with an oil path between them. A pull of about five times normal full load current compresses the spring and closes the two parts. The spring is just strong enough to resist compression on normal overloads. The time of retardation is adjustable by the viscosity of the dashpot oil, and overload setting is adjusted by screwing the dashpot up or down and so fixing the position of the solenoid plunger in the coil. The plunger strikes a smart blow on the release mechanism precisely at the predetermined current.

The principles of good contact are pressure and mass, and this has led to the contacts of the smaller breakers (up to 200 A) being forced together under a heavy spring pressure with a wiping self-cleaning action that eliminates the possibility of "single-phasing." The same principles have also led to the V construction of the contacts of the heavier switchgear.

In the main the switchgear is cast-iron cased, but fabrication is employed in certain cases. For truck and cubicle switchgear angle-iron frames are welded in jigs and enclosed in sheet metal. The larger oil tanks and certain flame-proof breakers are also constructed of welded sheet steel.

A French Thermal-storage Scheme

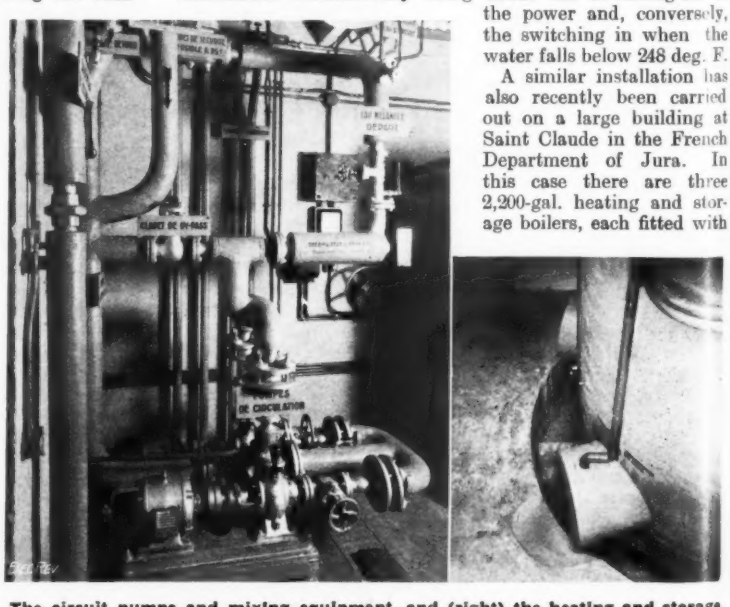
WHAT is believed to be the first thermal-storage scheme to be installed in Paris for building heating has been erected by the Société des Procédés Sauter, of St. Louis, Haut Rhin, and designed by the Compagnie Parisienne de Distribution du Chaleur, for a large block of flats at Boulogne-sur-Seine.

The building has a volume of 141,260 cu. ft., and the interior temperature is maintained at 60-65 deg. F., requiring 90,000 calories input per hour. A 5,060-gal. water-heating and storage cylinder is fitted with three Sauter 85-kW heating elements, all connections to which are externally made so that replacements may be made while the installation is in operation.

The elements are "on" during the whole of the night, *i.e.*, from 9 p.m. to 7 a.m.—thereby raising the water temperature to 248 deg. F. The water is pumped through a number of radiators in various parts of the building, and there is mixing of the "return" and delivery waters under thermostatic control. Under time-switch control, to avoid disturbance by switching the whole load on at once, the three banks of elements are switched on at intervals of twenty to thirty seconds. The total loading is 255 kW.

For the temperature control, three tubes are mounted in the accumulator, each enclosing the sensitive rods of a Sauter thermostat mounted in the clock circuit in such a way that the clock cannot actuate the cut-in relays when the temperature of the water in the accumulator stands at 248 deg. F.; furthermore, when the elements are at work, as soon as the above temperature is attained, the thermostats automatically bring about the switching-off of the power and, conversely, the switching in when the water falls below 248 deg. F.

A similar installation has also recently been carried out on a large building at Saint Claude in the French Department of Jura. In this case there are three 2,200-gal. heating and storage boilers, each fitted with an 80-kW element, the methods of operation and control being on somewhat similar lines to those described.



The circuit pumps and mixing equipment, and (right) the heating and storage cylinder showing two of the three elements

Large Cooking Equipment

A comprehensive range of appliances for restaurants and similar establishments

IT would not be correct to describe Messrs. Falk, Stadelmann & Co., Ltd., as newcomers to the industrial cooking equipment field, for there are many specially designed installations to their credit, but we believe that the new comprehensive range of "Efesca" restaurant apparatus is their first movement towards offering standard equipment. The range embraces roasting ovens, hot closets, a grill, toasters, a baking plate, a dough-nut fryer, fat-rendering pans, fish fryers, water boilers and coffee and milk urns.

The construction common to the four standard ovens is a cast-iron front and doors with heavy-gauge mild steel inner and outer casings, sandwiching heavy lagging, on a rigid framework, finished in stoved black with bright relief. The oven interiors are vitreous enamelled. Twin doors to each oven minimise loss of heat, and side heating is obtained from low-temperature elements with three-heat rotary switches and fuses. In conjunction with each switch there is an illuminated "on" and "off" indicator.

An earthenware-lined urn for coffee and milk

Single-, two-, three-, and four-oven equipments are all 57 in. high and 30 in. deep, and have respective widths of 34, 67, 100 and 133 in. Each cooking compartment measures 24 in. cube and is loaded at 6 kW. The company believes that the comparatively small cooking chamber is more economical and more flexible for the varying demands upon large kitchens. Back to back or two-deck equipments are alternative arrangements.

Eight sizes of hot closets in black and bright finish are available with loadings varying from 3 to 11 kW and widths from 39 to 123 in. Thirty-three inches is both the standard height and depth. The construction is heavy-gauge mild steel on a rigid framework with a cold-rolled steel-plate ground and polished hob. Sliding doors on one side run smoothly in polished steel grooves. Black-heat elements in the base of the closet and beneath the hob are separately controlled by three-heat switches, and illuminated indicators are arranged as with the roasting ovens. Open type bain-maries can be fitted into the hobs when required, and carving wells with covers and overhead lifting gear can also be supplied.

Grills and Toasters

The restaurant grill measures 16½ in. high, 19 in. deep, and 29 in. wide overall, and has a grilling chamber 22 in. wide and 18 in. deep. Mounted on legs it is 46 in. high. It has a cast-iron top, front and base, and a mild-steel back plate. A fluted base plate to the chamber conducts fats to a gravy drawer in the base, and a heavy grid slides in runners. Each of the two 3-kW element sections is controlled by a three-heat switch. All vitreous enamel and stoved black with bright relief finishes are available.

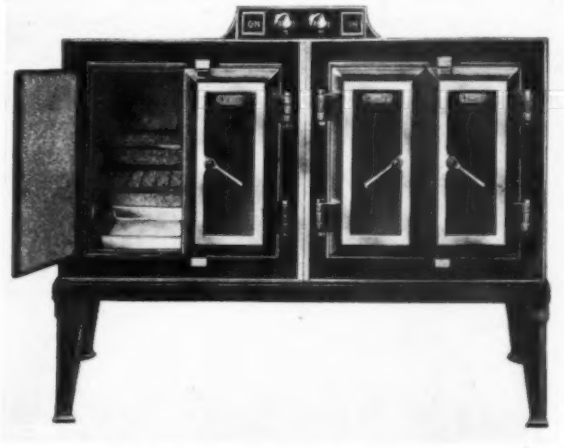
A restaurant toaster; a floor model fish fryer; and a restaurant grill

Loadings of 3 and 4.5 kW serve toasting areas of 15 in. by 10 in. and 21½ in. by 10 in. in the two toasters available. The respective widths are 20 in. and 28½ in., and the appliances have a common height and depth of 10 in. and 11½ in., or they may be supplied with legs giving an overall height of 38 in. A three-heat switch controls the whole element. The construction is mainly of cast-iron, with a sheet-metal back-plate, and the chamber is fitted with a grid and a crumb tray. Alternative finishes are vitreous enamel inside and out and stoved black with polished relief.

The 7-kW baking plate has a plate surface of 30 in. by 24 in. and overall dimensions of 30 in. by 9 in. by 24 in. deep, but it can be supplied with legs to give a height from the floor of 33 in. The plate area is highly finished so as to ensure quick adhesion of "skin."

Fish-fryers and Water Boilers

Because the fish and dough-nut fryers and fat-rendering pans are very similar in design and construction, the general description of the fish fryers will serve for all three equipments. A pan 18 in. by 18 in. by 7 in., loaded at 6 kW, is common to bench and floor equipments 16 in. and 36 in. high, respectively. They both measure 21 in. square. Black and mottled grey vitreous enamel are alternative finishes. They are constructed of heavy-gauge steel on rigid angle framework. The pans are of welded steel and are removable from the casing for cleaning purposes and to give access to the low-temperature radiant elements. By a special fitting on the basket container, operated by a simple movement of the handles, the basket may be suspended in the lifted position from the tops of the pan walls for draining purposes. An optional pan lid acts as a hinged cover, but it is entirely removable by a slight upward movement. The loading of the fat-rendering pan is just half that of the fish and dough-nut fryers.



A double-compartment roasting oven

Water boilers in 1- to 15-gal. sizes have loadings from 1,000 to 6,000 W. They have heavy-gauge copper bodies and lids, very heavy brass bottoms, side handles, and draw-off cocks, and they are tinned inside. The mica-sheathed elements, clamped to the bottom, are easily accessible. Normally a three-heat switch is arranged in the base chamber, but a separate illuminated indicating switchboard can be supplied with flexible metallic tubing and wiring for connection to the urn. A water-level gauge glass is available as an "extra."

In 1-, 2-, and 4-gal. sizes (1,000, 1,500, and 2,000 W) the urns for coffee and milk, &c., are fitted with earthenware linings, surrounded by outer water jackets. Separate draw-off cocks are provided for the inner container and outer jacket. The general construction of the body is similar to that of the water boilers.

Chromium-plated Searchlights

Chromium plating is very much in evidence to-day, and is becoming increasingly popular. It is now being used by the London Electric Firm as a finish for its medium-sized searchlight with a lantern barrel of 16in. diameter. This model, which is intended for a private yacht, is of the wheel-house type having the operating gear under the base.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Low-voltage Synchronous Clocks

One of the most useful of the many electrical aids to efficiency in the modern home is the frequency-controlled clock. As a means of providing the householder with accurate time it is hard to beat; it is silent and practically trouble-free.

There is, however, one point with regard to the synchronous clock which the manufacturers seem to have missed—is it absolutely necessary that the motor should be wound for a pressure of 200-250 V? Why not a pressure as low as 6-12 V? After all, it is the frequency of the supply which controls the time-keeping, and it should be possible to produce an instrument capable of running on the low voltage supplied by a transformer such as is at present utilised for bell ringing.

I have a decided objection to having loose flexible wires, which must remain alive, in positions where children can easily interfere with them, and put forward the above suggestion as a means of preventing unfortunate accidents.

I am bound to admit that where a home is provided with a fair number of plug outlets there is a better chance of selling a modern 230-V electric clock; but, at the same time, I submit that an entirely separate low-voltage clock circuit would be appreciated by many users, and would entail only a comparatively small initial expense for the necessary transformer and wiring.

INTERESTED.

May 23rd.

The Nearly All-electric House

In his article on this subject in the ELECTRICAL REVIEW of May 19th, Mr. E. T. Barton describes one of several systems which I have been advocating in print since 1921. The system that I then suggested "suitable alike for the workman's dwelling as for the nobleman's mansion and everything in between" was named "Co-Electric," and it was explained that this included a combination of hard fuel, which might be coal or coke or oil, in combination with electricity for all other purposes, including peak-load room warming in winter and intermittent room warming in summer.

In 1927 I had the privilege of reading a paper on the "Co-Electric" system before the Incorporated Municipal Electrical Association at its annual convention in Buxton, and this was reprinted in your journal. To my surprise the subject proved highly controversial, and several distinguished engineers criticised the policy, some calling it makeshift and others a half-way house. About an equal number, however, were equally emphatic that the paper was on the right lines, and it was better to face the economic facts rather than hide behind the slogan "The All-Electric House" when it was prophesied that the commercial outlook for the development of the completely electric house was very remote.

In the meantime, what has happened? The all-electric house has been given its trial, but apart from its sentimental ideal it does not attract the builder or the purchasing public, and it is doubtful if there are many hundreds of this type throughout the length and breadth of the British Isles. But what of the development of the "Coalectric" system as it is fashionable to call it? Its progress has been little short of wonderful; practically all the residential flats in the London district (and certainly all the best ones) have been built upon this plan, with not more than one coal fire per flat, the rest being electric. Such homes can be counted in their tens of thousands.

Nine-tenths of the large residential houses in London have been converted into flats and have been equipped on the "Coalectric" plan with very great success. If there is an exception, I have not heard of it.

Among the more recent developments in small houses on building estates, is the arrangement of a coal fire centrally placed in the living room, working in parallel with a thermostatically controlled hot-water cistern fixed in the linen cupboard. The reason for putting the cistern there does not need explanation. In addition to the real coal fire in the living-room, there are many electric fires, including those in the dining room and bedrooms. Supplied with the house is an electric cooker, an electric refrigerator, an electric wash-boiler, an electric towel rail, a shower in the tiled bathroom, and a specially designed shaving mirror which also illuminates the bathroom. In addition, wiring points for "listening in" are placed in all the principal rooms. All the above is situated in a rural area within twenty minutes of Waterloo Station, and is obtainable for £890 freehold, inclusive of all charges. I strongly advocate this practice of including everything necessary and desirable with a house. It is coming as surely as "accessories" are supplied to-day with the complete motor car.

HERBERT H. BERRY.

London, W.1, *May 24th.*

The use of reinforced concrete columns for mounting lamps is becoming increasingly popular. Below are shown various types installed at Maidstone (left), Scarborough and Liverpool. Some notes on these appear on page 793

Men or Women Demonstrators?

With reference to "C.'s" contribution to this discussion in your issue of May 26th, I should like to point out that electric cookery demonstrations are primarily organised for their sound advertising value; that is, to attract possible purchasers of electric cookers by an actual example of one in operation, thus showing the housewife what she *could* do if she had a cooker installed, rather than to teach the experienced cook how to do her work on an electric cooker which she has quite decided to have installed.

In any case, it is common knowledge that one dissatisfied consumer can do more harm than ten satisfied ones can do good, and the housewife may easily make mistakes at first due to a rather vague idea of "what the man was talking about"; whereas, after seeing one in actual use, the best method of operation comes naturally to her. I think the value of practical demonstrations of this kind cannot be overestimated.

May 28th. McG.

I was pleased to note that my remarks on this subject have not passed unheeded, and I only hope that those in "high office" have read the remarks of "Retrenched" and "C."

In my own experience, and from what I can gather, I should say that the majority of lady demonstrators are far from possessing a B.Sc. degree, so that "Woman Engineer" is, of course, an exception, and it was not to her that my remarks

applied. I must confess, however, that I was glad that "Retrenched" drew attention to the last paragraph of "Woman Engineer's" letter of May 5th, in which she states: "If there are women with the technical knowledge and ability to advise consumers regarding their electrical installation and whose salesmanship is up to standard, the supply authorities will naturally continue to engage them in spite of the fact that there are men possibly equally well qualified." Why should women "naturally" be given preference if it is agreed that knowledge and ability are equal?

Probably why so many women are employed in showrooms is because some chief engineers are under the impression that to sell to a woman one has to be a woman. I would draw their attention to the selling organisations of speciality domestic appliances, such as washers and vacuum cleaners, which employ men only to sell their products, though, of course, they are sold to women.

I would like to suggest to E.D.A. that in addition to holding a Public Speaking Contest it holds a Selling Demonstration Contest, in which one person has to sell an appliance to another; this should be most helpful, especially if the contestants were drawn from the ranks of men and women. For one thing, it would encourage both sexes to study selling, and for another, the results might help to prove who are the better at selling—women or men demonstrators. A. C. H.

Domestic Water-heating

In his letter in your last issue Mr. Jervis suggests that provided the hot run to the kitchen sink does not exceed 30 ft., the installation should be efficient. Now the losses on this length of ¾ in. pipe supplying a sink having an average household use will not be less than 15 kWh a week and may be considerably greater. Taking the smaller figure, the losses, at ¾d. per kWh, will cost 12s. a quarter—sufficient to pay the full hire charge for a proper storage heater.

Even when the immersion heater installation is the most efficient arrangement for the main hot water supply, there are often cases where an additional small storage boiler mounted close to the sink will be more economical than an immersion system with losses on a long run of pipe in frequent use. D. J. B.

May 29th.

This is the new Diesel-electric locomotive built by Messrs. Harland & Wolff, Ltd., for the Belfast and County Down Railway **(See page 793)**

South African Municipal Electrical Engineers

Annual convention at Port Elizabeth

THE eleventh annual convention of Municipal Electrical Engineers (Union of South Africa and Rhodesia) was held at Porth Elizabeth in April. Approximately eighty members and councillor delegates attended, as well as a number of visitors connected with one or other branches of the electrical industry.

A number of papers were submitted to the convention as well as a number of subjects introduced for discussion. Mr. D. W. Ritson's paper on "Changing over from D.C. to A.C." was one of special interest to engineers in charge of medium and small undertakings, and was productive of fruitful discussion. A paper by Messrs. John Roberts and Colin Dawson contained much useful information regarding the utilisation of surplus heat or power in certain industries, such as the Natal sugar industry, for power production and delivery to a public electricity undertaking. Whilst the scope of such applications may be somewhat limited, the authors clearly demonstrated the undoubted advantages accruing to each party where such an interchange of power is feasible.

Mr. J. D. Low (chairman of the Cape Town Electricity Committee) dealt with the "Provision for Depreciation in regard to Public Utilities" in a masterly manner. His subject was one of very vital interest to all engineers and managers of electricity undertakings, as well as to councillor delegates; both members and delegates joined freely in the discussion which followed, and it is hoped that as a result of this paper and discussion much good may result and that the position of those engineers who, in the past, may have experienced difficulty with their Councils over this vexed question will be considerably eased.

Mr. G. H. Swingler (Cape Town) opened two discussions on the control of circuits for cooking ranges and "model" regulations. Mr. L. L. Horrell (Pretoria) initiated two debates on inferior electrical material and earthing, while Mr. L. F. Bickell (president, Port Elizabeth) introduced a discussion on coal railage charges. Mr. W. Mortimer Mail (Kokstad) contributed a short paper on broadcasting as it affects municipal electrical undertakings, &c.

South African municipal electrical engineers and friends at Port Elizabeth

Visits were arranged to the Port Elizabeth power station, two high-voltage sub-stations, the Eastern Province Cement Co., General Motors, and the Ford factories. A film was exhibited showing the construction of the Scottish 132-kV grid line, and other functions were a civic dinner, a visit to a theatre, a moonlight motor trip, and a tug trip around the Bay, during which an opportunity was taken of inspecting the harbour construction work.

The new president of the Association is Mr. L. F. Bickell, A.M.I.E.E., city electrical engineer of Port Elizabeth, and the hon. secretary and treasurer is Mr. F. A. P. Perrow, A.M.I.E.E., P.O. Box 369, Port Elizabeth.

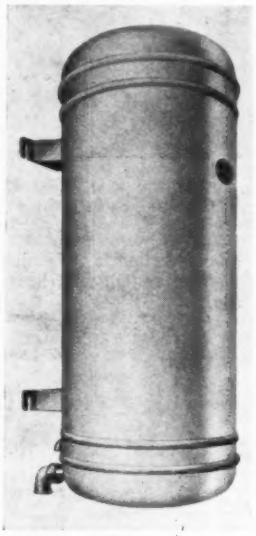
New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

Storage Water Heaters

Apart from the broader interest which accompanies the entry of an old-established electrical concern into the domestic field, and to the introduction of new water heaters at the outset of the E.D.A. Water Heating Campaign, there are many novel features of design and construction in the "Charlton" equipment produced by MESSRS. JOHNSON & PHILLIPS, LTD., Charlton, London, S.E.7.

The outstanding constructional feature is a new type of flexible element which has rendered it possible to employ vertically placed elements for all sizes of heaters without the necessity of providing the space at the bottom which would be required to withdraw rigid elements. Heavy-gauge nickel-chrome spirals are threaded through interlocked refractories, so forming a flexible assembly.



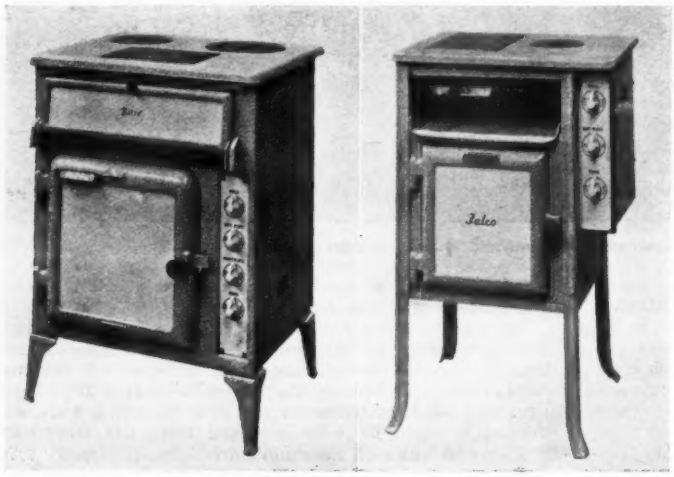
The new "Charlton" water heater

Reasons given by the company in support of the vertical element are that the slight contractions and expansions of the element unit, varying with the cold- and hot-water dividing line or level (cold water entering at the bottom) prevents scale from building up on the element casing. At any one time the temperature of the horizontal element is uniform throughout its length. Further, there is a tendency for scale to build up more on horizontal surfaces. Horizontal elements also demand banks of tubes with a tendency to concentration of non-effective heat within the banks.

The means of supporting the heater are interesting. Instead of being riveted directly to the outer casing, the brackets are passed through slots in this casing to which they are welded on the inside, and *via* special heat insulating supports the weight of the inner container is taken directly by the brackets, without the imposition of strain on the outer casing or the bottom end.

There is novelty also in the apparatus plate which is a copper pressing of special shape and design to reduce heat losses. The element and thermostat sheaths, the inlet and lower outlet pipes, and the drain outlet are all welded to it. The bi-metal thermostat is set at 190 deg. F. standard. Absence of screw heads on the outer surface adds to the pleasing external appearance of the equipment.

Measures to prevent furring troubles include the employment of full-bore internal pipes throughout, and the elimination of short bends and angles. Plumbing work is simplified by the water connections being brought out through the outer casing close to the wall. Similarly electrical connection is facilitated by a length of t.r.s. flexible cable, with the connections permanently made at the element and thermostat busbars being brought out through a conduit elbow at the base.



The Falco "5380" and "5239" cookers

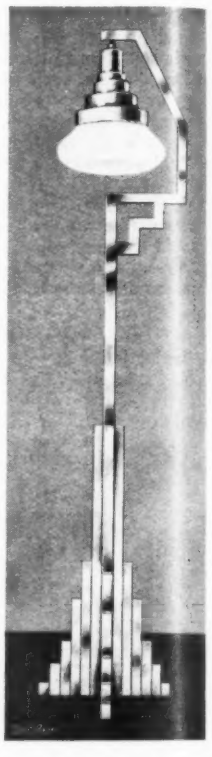
Pressure and non-pressure (including cistern) types are all served from a range of identical containers in sizes from 2 to 30 gal. (500 to 2,500 W). Non-pressure equipments are available in 2-, 5-, and 12-gal. sizes, and the pressure apparatus in 5-, 12-, 16-, 20- and 30-gal. models. A 2-gal. non-pressure heater is listed at £6, while a 30-gal. pressure heater for wall mounting costs £23. The 20- and 30-gal. models are alternatively available for floor mounting.

Special Diffused Lighting Equipment

Since our last review of "Controlled Lighting" equipment produced by G.V.D. ILLUMINATORS, Aldwych House, Aldwych, W.C.2, the company has developed and introduced several new fittings employing the same system of "control," including "inverted bowl" type fittings and colour-matching equipment.

The outstanding advantage of the indirect lighting apparatus was demonstrated to us with a pedestal floor standard. Without the special bowl and with the light "on" the ceiling and upper portion of the walls were well lighted, the lower portions of the walls being shadowed from a definite line of demarcation. When the patent bowl was placed in position the whole of the room surfaces were evenly lighted. Both pedestal and pendant units for indirect lighting can be made to any design or decorative requirements.

The "G.V.D." artificial daylight unit affords accurate colour-matching lighting and also good general-purpose lighting. With a high efficiency of 30 to 44 per cent. its spectral distribution curve can be varied to resemble closely noon sunlight, overcast north sky-light, or blue north sky-light.



A G.V.D. floor standard

Accumulators for Radio Hire Service

We have been asked by MESSRS. PETO & RADFORD, 50, Grosvenor Gardens, S.W.1, to state that the "BD" type accumulators, which were mentioned under the above heading in our issue of May 19th, are now being made by them.

Two New Cookers

Two new "Falco" cookers introduced by the FALKIRK IRON CO., LTD., Mortimer House, 37-41, Mortimer Street, London, W.1, are both of the fixed-oven construction with sealed joints between the oven and the front frame. Enclosed plug-in large-area "slab" elements are arranged at the sides and bottom of the oven.

The larger cooker, No. 5380 (£16 10s.), has oven cooking space of 15 in. by 16 in. by 16 in. The hob is equipped with two "Chromalox" 1,750-W boiling plates (8 11/16 in. and 7¼ in. dia.), and a 2,000-W grill simmering plate (10⅜ in. by 7¼ in.). The total loading is 7,300 W, and the overall dimensions are 26 in. by 22 in. by 37 in. high. The finish is grey mottled vitreous enamel inside and out.

The grilling chamber measures 22 in. wide by 18 in. deep by 6¼ in. high and has a base with bevelled sides and back. The crownplate is white enamelled, and the hinges are spring mounted. An enamelled grill pan with grid completes the equipment. The switches are of the back-connection type with single nut fixing, and the fuses are readily accessible.

The other cooker (No. 5239) has "plug-in" enclosed side and bottom oven heating elements of a light box-type construction and of large area with a maximum loading of 1,400 W. The junction of the oven with front frame is sealed by means of packing to prevent ingress of steam into the lagging, and the finish of the oven is vitreous enamelled. The oven dimensions are 11 in. wide by 12 in. deep by 11⅜ in. high, and the equipment comprises one non-tilting grid shelf, one sheet shelf, and drip tin.

The hob is furnished with a combined griller-boiler having a maximum loading of 2,000 W and measuring 10⅜ in. by 7¼ in. In addition a "Chromalox" boiling plate is fitted, and this boiling plate can be had in alternative sizes, 8 11/16 in. diam., with maximum loading of 1,750 W, or 6⅜ in. diam., with maximum loading of 9,500 W (both these plates have three heats), or 5¼ in. diam., 600 W (single heat only). The grilling chamber measures 15 in. wide by 14 in. deep by 5 in. high, and is complete with grill tin and grid.

The floor of the grill chamber is an aluminium casting with high sides and a large channel in front, thus ensuring that no spillings can penetrate into the lagging. The switches and fuses are similar to those of model 5380. The overall dimensions are 22 in. wide by 17¼ in. deep by 36 in. high, and the finish is vitreous enamelled mottle grey with white enamelled panel door and switchplate.

A Bathroom Fitting

A new fitting, known as the "Dotlite," is being marketed by MESSRS. L. G. HAWKINS & CO., LTD., 30, Drury Lane, London, W.C.2. It is suitable for bathrooms, landings, corridors, &c., and is priced at 8s. 6d. with a chromium-plated base, and 6s. 6d. with a base finished in white enamel.

The "Dotlite" fitting for bathrooms

Static Condensers

The growing popularity of neon signs has led the DUBILIER CONDENSER CO. (1925), LTD., Ducon Works, Victoria Road, North Acton, W.3, to develop a range of static condensers for the correction of their power factor.

Where the total capacity required is more than the standard capacity of one condenser, units may be connected in parallel. The condenser units with ordinary terminal connections can be used in protected positions or be assembled in groups in a weather-proof box or other enclosure. Alternatively, the units can be furnished with weather-proof terminal connections.

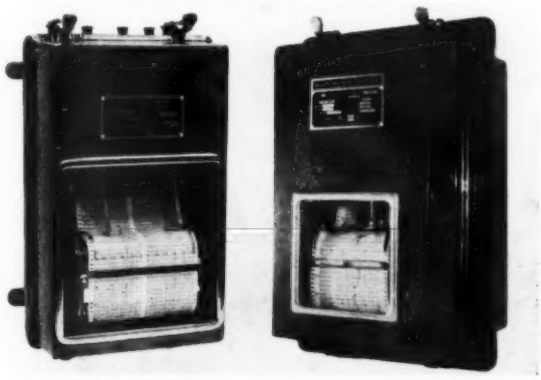
The condensers are of the solid-filled and impregnated paper-dielectric type fitted in sheet-metal containers, into which the condenser elements are hermetically sealed by high-melting-point compound. Soldering lugs or connection screw-type terminals are provided.

On the standard units provision is made for fixing brackets or lugs, and three alternative terminal connection arrangements are available as follows: Type "N1," indoor type with terminal lugs for soldered connections; type "N2," indoor type with protected screw terminals; type "N3," weather-proof, with tough rubber-insulated flexible connections. Eleven different capacities can be obtained between 1 mF. and 20 mF. for use on 250-V, 50-cycle supplies.

Recording Instruments

A new range of a.c. and d.c. recording instruments is being placed on the market by MESSRS. ELLIOTT BROTHERS (LONDON), LTD., Century Works, Lewisham, S.E.13.

The a.c. kVA recorder is a direct-reading instrument used in connection with the summation of power charges on a kVA basis. It can be supplied for 3-phase 3- or 4-wire systems and is a simple, robust graphic recording instrument with large working forces and a linear scale. The direct-marking method for operating the pen has been adopted, and rectified currents are employed under a new principle, the instrument being practically independent of temperature and frequency variations of ordinary magnitude. The power consumption of the 5-A, 110-V models is 3.2 VA per current element and 7 W per volt element at 50 cycles.



The Elliott "R.L.C." (d.c.) recorder and an a.c. model

The current coils are wound for 5 A, and are adopted for use with standard current transformers, and the maximum self-contained voltage is 440.

The chart has straight-line co-ordinates with a working width of 3.75 in., is easy to read, and moves at 1 in. per hour, driven by a self-contained clockwork unit, although a synchronous motor-driven clock can also be supplied. The prices range from £76 17s. 6d.

The new d.c. models supplied for switchboard mounting or portable service are of the permanent-magnet moving-coil type. The duplex recorder has one clockwork and two separate complete electrical movements each with its pen recording on its own chart. The two records are made side by side, on the same roll of chart paper, which moves 1 in. per hour. Type "R.L.C." (switchboard pattern) costs from £44 4s. 3d., and type "Q.L.C." (portable pattern) from £51 17s. 9d.

A New Marconiphone Receiver

A new Marconiphone five-valve superhet receiver is about to make its appearance on the market. The circuit is a four-valve superheterodyne and rectifier for operation on 200/250 V supplies at 50/60 cycles. It incorporates a constant-peak band-pass input preceding a screened grid combined detector oscillator, which is followed by a transformer-coupled variable-mu intermediate frequency amplifier and power grid second detector. The output from this is connected with a triple-compensated auto-transformer coupling to an indirectly heated power pentode, the fifth valve being a heavy duty rectifier.

An interior view of the Marconiphone "272" receiver

The speaker is of the energised moving-coil type, fitted with hum neutralisers. A 9 kc. selectivity is claimed with an absence of second channel interference, splash, etc.

A mains aerial is used, and an earth is not essential. Volume and tone controls are incorporated, and provision is made for the permanent connection of a pick-up. The undistorted output of the last valve is 2 W, and the total power consumption 65 W. The manufacturers of this new receiving set are the MARCONIPHONE CO., LTD., Radio House, Tottenham Court Road, W.1.

A Lift-out Fuse Isolator

A lift-out fuse isolator which has just been introduced by SWITCHGEAR & EQUIPMENT, LTD., 49, Queen Victoria Street, E.C.4, is particularly suitable for mounting directly to a single pole, in the form illustrated, or to an "H" pole by means of one cross supporting channel.

The chief feature of the isolator is the insulated bell-shaped operating guide, by means of which the fuse is easily fitted and removed by a portable operating rod. The guide has an external diameter of 5 in., and, being approached in the vertical plane, it is easily fixed even with a 20-foot rod. The head of the rod is fitted with a quick-thread screw, a few turns of which attaches the fuse clamps to the rod and enables the fuse to be removed from the contacts and brought to ground for renewal. The fuse is fitted with quick-release clamps, and the weight of the movable portion has been reduced to a minimum. Replacing the fuse is equally simple. The fuse itself can either be of the liquid or rewirable pattern, and "blown" fuses of both types are easily detected from ground level. The fact that an 11-kV three-phase equipment, complete with improved liquid fuses, is supplied for less than £10 indicates a solution to the problem of protecting small rural transformers on low revenue-producing lines.

A lift-out isolator with bell guide for operating pole

The insulators are of high-quality English manufacture with characteristics exceeding B.S.I. recommendations for 22 kV, and the current-carrying parts are substantially designed in hard-drawn copper or brass. All current-carrying parts are dull nickel plated, and steel parts are hot galvanised. Mechanical cone grip connectors are fitted. The guide is made of strong insulating material moulded on to the lower fuse contact.

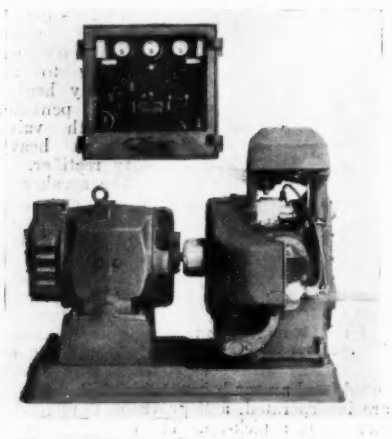
D

A Floating-battery Lighting Set

In introducing their new floating-battery house-lighting set, PETTERS, LTD., Westland Works, Yeovil, claim to provide the ideal point of balance between the ordinary battery equipment, with its comparatively high initial cost, and the direct lighting equipment, with its reduced economy factor.

The new set embodies a small storage battery capable of dealing with loads up to 100 W, so that if only one or two lamps are required at a time, the engine need not be run. On this load being exceeded, the generating set starts up automatically and supplies electricity to the system at a rate just in excess of the demand, the surplus going into the battery to recharge it in readiness for subsequent small discharges. When the load drops to about 75 W, the engine stops and the battery carries the load. The engine speed is electrically controlled proportionately to the demand, ensuring the minimum fuel consumption.

The power unit is a "Petter Universal" single-cylinder four-stroke-cycle air-cooled 2 b.h.p. petrol engine with forced-feed lubrication. A centrifugal-type fan incorporated in the flywheel, with a carefully designed guard, provides ample cooling draught for continuous full-load running. The generator has a maximum output of 8 A at 125 V, and is directly connected to the engine by a flexible coupling, all being mounted on a substantial bedplate. The robustly designed switchgear, arranged for wall mounting adjacent to the set, is dirt-proof and provided with a glazed, hinged door.



The new Petter floating-battery house-lighting set

The switchgear equipment includes a push-button controlled voltmeter, charge and discharge ammeters and fuses, a special battery cut-out, a master relay which controls the starting and stopping of the set, a low-voltage relay which guards against over-discharge of the battery on loads insufficient to cause the master relay to operate, a "motoring" time-limit relay which cuts off the battery from the dynamo should the engine fail to start for any reason after a predetermined period has elapsed, a starting relay to ensure the commencement of the recharge immediately the engine speed is sufficient, an electrically operated trip switch, a motor starting contactor, and a "hand-automatic" switch which enables the set to be run without the electrical controls in operation for the periodical "boosting" charge of the battery. The engine is entirely self-contained.

With a 45-cell, 30-Ah battery the set is marketed for £131. Other models of the same general design, but of somewhat greater capacity, are to be introduced shortly.

The "Mary Ann" Vacuum Cleaner

We learn that the "Mary Ann" vacuum cleaner has undergone extensive modifications in design. Two disinfecting pads are now supplied with each cleaner; the braided flexible has been increased to 7 ft. in length, the extension tubes are 4 in. longer, and the small "Bakelite" carpet nozzle has been replaced by a wide nozzle in aluminium with a serrated rubber buffer, which not only affords protection to the furniture, but also acts as a cotton pick-up on carpets.

The oval wooden brush nozzle is now much larger, and is also fitted with a rubber sealing band, while new accessories are a circular wooden brush nozzle and a special upholstery nozzle in aluminium. The crevice and blowing nozzle of small sizes has been replaced by one of twice the size with suction apertures both at the end and either side, while the length of the flexible cable has been increased.

The cleaner is made by BRITISH ELECTRIC DOMESTIC APPLIANCES, LTD., 3, Hanover Court, Moor Lane, London, E.C.2.

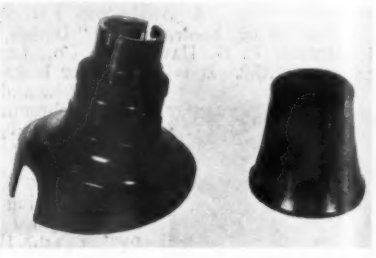
Photo-flood Lamps

The GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2, is now marketing at 7s. 6d. a new photo-flood lamp for indoor moving-picture making. It has a life of about two hours, which is sufficient to enable 2,000 ft. of cinematograph film of the sizes generally employed for amateur work to be exposed.

It is loaded at 200 W and has a light output of approximately 5,500 lumens. Models are available for 100/130 V and 200/280 V, and the measurements are 160 mm. long by 80 mm. in diameter. An e.s. cap is fitted.

An Angle-type Batten Holder

The new "Goltone" angle-type "Bakelite" batten holder which has recently been placed on the market by MESSRS. WARD & GOLDSTONE, Frederick Road, Pendleton, Salford, is suitable for use in many different situations—such as garages, over doorways, cellars, lifts, &c. It can be obtained finished in brown or walnut at 12s. per dozen. A Home Office shield shade carrier costs 1s. 6d. per dozen extra. The fixing holes have 2-in centres, and the diameter of the base is 2⅛ in. For lavatories, bathrooms and hospitals it can be supplied in "Ivorant" white moulded composition.

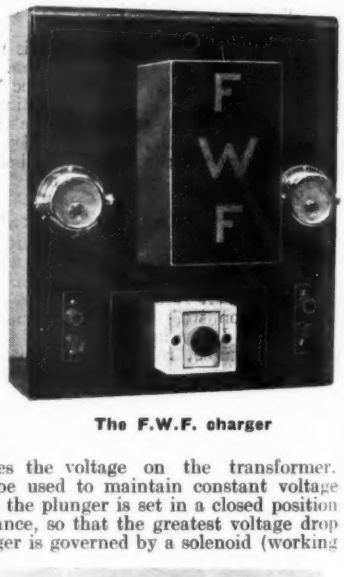


The "Goltone" angle-type lampholder

A Self-regulating Charger

MESSRS. F.W.F. & Co., Brock Street, Lancaster, are just commencing to market a new a.c. battery charger priced at 10 guineas.

This charger is self-regulating, thus protecting both the rectifying valve and the accumulator, and has a capacity of 6 A at from 10 V to 75 V. The valve is provided with an inspection window, and in the charger there are two circuits with a 6-A meter in each so that both a small and large accumulator can be charged at the same time, controlled by the self-regulating choke. The transformer is guaranteed for two years, and the self-regulating choke, which is the outstanding feature of the charger, is designed to withstand a short circuit on the d.c. side without overloading the valve or resistance lamps. This choke may be used as a safety device to transformers by setting the current choke plunger to obtain the least pressure, the springs or weights being set for the desired overload. The operation of the plunger of the current choke closes the magnetic circuit and reduces the voltage on the transformer.

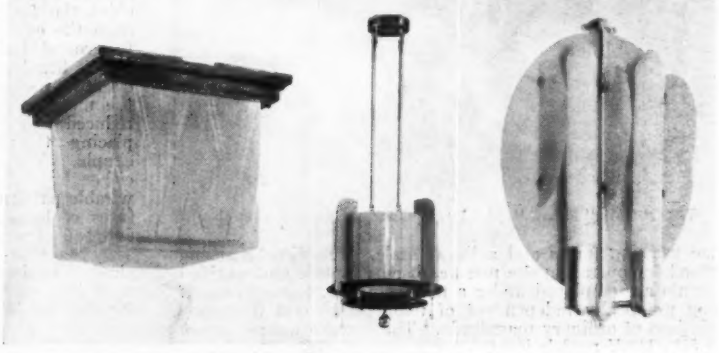


The F.W.F. charger

The choke may also be used to maintain constant voltage on feeders. In this case the plunger is set in a closed position giving maximum impedance, so that the greatest voltage drop is at no load. The plunger is governed by a solenoid (working on the same spindle carrying the current of the circuit), which requires constant voltage. The resultant magnetic force of the choke and the solenoid can be adjusted to give constant pressure by the automatic opening and closing of the magnetic circuit of the current choke.

To improve the magnetic effect, when closed the core is made up of a continuous laminated strip.

In valve rectifiers the choke protects the valve by retaining a constant pressure on the filament, and, by allowing it to heat up before taking any load, protects it against overload.



Three of the many fittings recently introduced by the General Electric Co., Ltd. The "Santan," the "Sanstone," and the "Sanbol"

New Books

Industrial Electric Motor Control Gear, by W. H. J. NORBURN. Pp. 256; figs. 159. London: Sir Isaac Pitman and Sons. Price 10s. 6d.

The use of the electric motor for industrial purposes has grown to such an extent in recent years that the day has long passed when a simple form of starter with the necessary overload and no-load protective release could be regarded as a sufficient means of control. The user of electric power is not obtaining the best results unless he installs the best forms of control gear that are available, such as push-button control, contactor gear, remote control gear and various forms of automatic equipment.

In the relatively small space at his disposal the author has dealt with the equipment required with various types of a.c. and d.c. motors and without going too deeply into the theory of design he is able, with the aid of neat wiring diagrams, to give a lucid explanation of the functions of the various parts. An appendix gives the starting currents representing the standard practice of manufacturers in Great Britain, these being in accordance with British Standard Specifications.

This book should prove of the utmost value to the maintenance engineer whose duty it is to understand the why and the wherefore of the plant placed in his charge as well as to the wireman who has to connect it up in the first place while the student of electrical engineering will be able to gather from it a good idea of the possibilities of control gear.

L'Exploitation des Chemins de Fer, by M. H. FONTY. Pp. 46. Paris: Publications du Journal *Le Genie Civil*.

This booklet is a reprint of a series of articles by the director of the French Office National pour le Developpement de la Traction Electrique, which recently appeared in our French contemporary *Le Genie Civil*. The author devotes considerable space to details of the working of railway traffic by electricity and steam (coal), chiefly using figures for the latter that have been made public in Germany. The French steam-operated railways are, in the national interest, at present using coal to the extent of 18 per cent. of the French output; nevertheless, a good deal of that consumed is imported. On the other hand, the lines so far electrified are using only from 4 to 5 per cent. of the output of hydro-electric energy.

The author considers that electrification is warranted from the national standpoint, inasmuch as it would make use of the country's practically unlimited water-power rather than its coal resources, which are steadily being exhausted. He is not greatly impressed by experiments with Diesel-engined locomotives because their use would entail dependence on imported liquid fuel.

M. Fonty deals with some of the advantages of electric traction to the railway undertakings, such as a fuller use of existing tracks and stations, greater acceleration, the shortening of journey times, the lower cost of locomotive maintenance, and the reduced strain on drivers. Railway electrification has been followed by extension of the electricity supply facilities in the towns and villages in the vicinity of the railways and at lower prices than were previously possible. The author believes that the day of the railways is not over, but that they can be adapted to modern conditions and be made profitable only by electrification. He urges that, despite the existing adverse economic position, the electrification should not be delayed, lest the advantages it offers are lost by increased road-transport competition.

Commercial Motor Road Transport, by L. M. MEYRICK-JONES. Pp. 363; illus. London: Sir Isaac Pitman & Sons. price: 15s.

This book is intended presumably as a guide to the intelligent layman in making a choice of vehicles for specific duties as, technically, it is somewhat elementary. As such, it may be recommended as a well arranged and lucid work. The case for the use of the electric (battery) vehicle is fairly stated with its limitations due to the present short operating radius, but more might have been made of its marked advantages for short distances, especially where frequent stops are entailed. To electrical men the chapters giving capital and detailed operation (standing and running) costs of different types of vehicles will probably be of the greatest interest; the eight electric vehicles mentioned range from 7 cwt. to 5 tons. The chapter on electrical maintenance is practical, but is limited to the batteries. The legal section is useful and easy to follow.

Erdung, Nullung und Schutzschaltung, by DR.-ING. OSKAR LÖBL. Pp. 111; figs. 78. Berlin: Julius Springer. Price: Rm. 9.

"Earthing, Compensating, and Protective Switching," with explanations of the earthing regulations, may be taken as the English version of the title of this book. This in itself is sufficient to arouse the interest of many electrical engineers in this country. The book is in three main sections, fundamental principles, protective measurements, and the earthing regulations with explanations.

The section on regulations deals with their scope and applicability and with the erection of earthing devices and testing of protective equipment. Of particular interest are the sections dealing with dangerous voltages, earth resistance, and earth potential gradients.

The question of the quantitative value of dangerous voltage is of much importance. Dr. Löbl has gone back to the work of Professor Weber at Zurich for the physiological base of his contentions. As this work was done in 1897 it might appear out of date, but the summary of the tests given shows that they were of a remarkably thorough nature, and for this reason have stood the test of time. We suggest, however, that the time of contact should be taken into consideration as well as the voltage in determining the degree of danger to human or animal life.

The notes on earth potential form a concise practical summary of the comprehensive investigations of Rudenberg and other German authorities. The printing and the diagrams are of the usual high standard of the publishers, and the book is to be recommended.

Train Lighting and Heating. Pp. 133; illus. London: The Locomotive Publishing Company. Price: 7s. 6d.

This is a most comprehensive survey of the subject. It includes descriptions of the various electrical systems of lighting (including emergency equipment), heating, cooking, and ventilation on trains, with diagrams and useful illustrations. A brief section deals with specifications of details of switches, controllers, and couplers, with well-selected drawings. The information given regarding dynamos and their suspension and drives, batteries, control arrangements, illumination, and wiring and accessories is of a thoroughly practical character; so also is the chapter on maintenance, which contains an account of the procedure of some of the companies.

The Wonder Book of Electricity. Edited by H. GOLDING. Pp. 256. Illustrated. London: Ward, Lock & Co. Price: 5s.

Considering the number of subjects already dealt with in this series, a volume upon electricity is long overdue, but the completeness and modernity of the work are commendable points. Over thirty articles, dealing with light-current and heavy-current electrical engineering, form delightfully simple stories, although in parts there are curious mixtures of the technical and general. The book is worth its cost for the excellent illustrations alone.

Shorter Notices

"The Conductivity of Solutions and the Modern Dissociation Theory." By C. W. Davies. 2nd edition. Pp. 281; figs. 32. London: Chapman & Hall. Price: 15s.—The first edition of this book was reviewed in these columns on August 22nd, 1930. The great volume of work which has appeared during the last three years has made it impossible to bring the book up to date without lengthening it, and the new material has also entailed a rearrangement of much of the old. Two new chapters dealing with the practical applications of conductivity measurements have been added.

"Automobile Engineering." Edited by H. Kerr Thomas. Six volumes. London: Sir Isaac Pitman & Sons, Ltd. Price 7s. 6d. per volume.—These six volumes are a reprint in book form of part of the thirty weekly instalments which have been in course of publication since October last, and they form a comprehensive treatise on the subject.

"Television To-day and To-morrow," by S. H. Moseley and H. J. Barton Chapple. London: Sir Isaac Pitman & Sons. Price: 7s. 6d.

"The Electrician Annual Tables of Electricity Undertakings," 1933. Pp. 262. London: Benn Bros. Price 10s.—In the 46th edition all the usual features have been retained and in many cases considerably amplified. Table "A" ("British Undertakings") contains a substantial number of new entries, while that section, and sections "B" and "C" ("Smaller Undertakings" and "British Electric Power Companies") have been revised. Other new features are an introductory note dealing with the activities of the Central Electricity Board and the inclusion, where possible, of the addresses of the undertakings mentioned.

"Standard Costs," by H. E. Kearsey. Pp. 177. London: Sir Isaac Pitman & Sons. Price 7s. 6d.—A complete introduction to the application of scientific method in the development and use of cost standards dealing constructively with each separate branch of the subject. It is of immediate value to all concerned, directly or indirectly, with modern costing methods.

"Measurement of Air Flow," by E. Ower. 2nd. edition. Pp. 243; figs. 85. London: Chapman & Hall. Price 15s.—The first edition of this work, which was reviewed in our issue of April 20th, 1928, has been subjected to careful and extensive revision as the progress in the technique of air-flow measurement has necessitated the rewriting of certain parts (Chapter VI is almost entirely new). A new chapter (IX) has been added to give information of a practical nature.

The June number of *Distribution* (W. T. Henley's Telegraph Works Co., Ltd.) is a special issue to mark the journal's fifth "birthday." It has a beautifully-coloured cover bearing a view of Poole Harbour and contains a varied selection of interesting, well-illustrated articles.

Parliamentary News

(BY OUR SPECIAL REPORTER)

IN the House of Commons on May 24th Major Edmondson asked the Minister of Transport whether he had considered the resolution sent to him by the Oxfordshire County Council with reference to certain actions on the part of the Central Electricity Board, and whether he would take such steps as might be necessary to ensure co-operation and consultation in the future between the Board and local authorities in whose areas operations by the Board were contemplated.

Mr. Stanley said he had considered the resolution referred to as well as a previous request from the County Council that he should use his influence with the Board to induce it to meet the requirements of the Council with regard to certain town-planning proposals which were finally settled only after the Board's line was arranged. He understood that the Board had agreed, at some inconvenience and expense, to alter the site of two towers which, he hoped, would be regarded as a reasonable arrangement. With regard to the second part of the question, he was informed by the Board that it was its practice in every case to co-operate with local authorities as far as possible.

The Oil Duty

On May 24th, during the Committee stage of the Finance Bill, Mr. Ramsay moved an amendment to the proposal to impose a tax of 1d. per gallon on heavy hydro-carbon oils, with the object of differentiating between the lighter and heavier classes of oil. The amendment sought to limit the tax to oils with a viscosity up to seventy-five seconds. This would make the lighter oils, such as kerosene, various classes of lighter lubricating oils, and the light oil used in high-speed Diesel oil-engines, all subject to the tax, but the heavier oils used for fuel purposes in a manufacturing process would be exempt.

In the debate which followed many members urged that the full tax should be retained in order to help the coal industry. Mrs. Ward said that if all the industries which were now using oil would use gas or electricity it would directly affect the coal industry. We had spent millions of pounds on a grid system in this country in order to bring cheap electricity from the North of England to the South. She was told that one of the reasons why we did not get cheap electricity was that we did not use enough; but surely if we got something to encourage the use of electricity it would enable it to be obtained more cheaply, and practically all the electricity in the country was generated by coal.

Mr. Chamberlain declined to accept the amendment. He said that, even if it were true that the additional burden on an individual firm or industry were sufficiently great to diminish its expansion and contract its activities, they would have to set against that the increased employment which would be created in the coal, gas, and electricity industries, and on the railway systems of the country by the imposition of the tax. He maintained that the tax was a good one, and that, taking the broad national view, it was calculated to help British industry.

The amendment was negatived by 239 votes to 57. Later, Mr. Chamberlain agreed to exempt from the tax oil used for coastal shipping, pilot cutters, and trial trips at sea.

In the Courts

IN a Divisional Court of the King's Bench, consisting of the Lord Chief Justice and Justices Avory and Humphreys, on May 25th, Mr. E. M. Rees, a factory inspector, appealed from a decision of the Justices of Denby who had declined to find that the North Wales Power Co., Ltd., had been guilty of offences against the regulations framed under Section 79 of the Factory and Workshops Act, 1901.

The Attorney-General (Sir Thomas Inskip, K.C.), who appeared for the appellant, said that the allegation against the company was that in a sub-station at Bron-y-Nant, Colwyn Bay, it had neglected to observe No. 23 of the regulations in that an insulating screen was not provided and was not kept permanently in position in the neighbourhood of and guarding the live conductors to a certain transformer switch, with the result that one of the company's employés, a Mr. Arthur Leadbetter, was killed. Leadbetter was working on top of the transformer and must have touched a conductor with his body, for he fell to the ground and died in hospital. There was a similar charge against the company with regard to certain live 20,000-V conductors.

It was contended on behalf of the company before the justices that it had taken all possible precautions to protect its employés and that it was not necessary for Leadbetter to get on top of the transformer. The justices dismissed the summonses, holding that the company had taken all practicable precautions.

The Attorney-General contended that this dangerous gear had not been screened and properly guarded, and therefore that the company had neglected to observe No. 23 of the regulations and Section 136 of the Act of 1901. Counsel said that it was necessary for anyone cleaning the top of the transformer to get part of his body on the top of it and then straighten up his body into a vertical position and possibly make accidental contact with the conductors. He contended that, in the circumstances, the company had been guilty of clear breaches of the regulations and that the appeal ought to be allowed.

Mr. Moritz, K.C., on behalf of the company, supported the decision of the justices, contending that there had been no breach of the regulations or of the statutory provisions by the company.

Their Lordships held that there had been a breach of the regulations, and allowed the appeal, with costs, remitting both summonses to the justices with directions to convict.

Winding-up Petitions

In the Companies Court on Monday last, Mr. Justice Bennett had before him a petition for the compulsory winding-up of Electro-chemical Installations, Ltd. Counsel said the matter had stood over to make certain terms to be carried out between the company and the petitioning creditor. The terms had been carried out and his client had been paid a substantial part of his debt by a third party and there was a guarantee for the balance. He therefore asked that the petition should be dismissed, the costs to be taxed and paid by the company.

His Lordship ordered accordingly.

On the same day Mr. Justice Bennett heard a petition for the compulsory winding-up of London Electric Service, Ltd. Counsel for the petitioning creditors said their debt was £90 for goods supplied last year.

The company did not appear and his Lordship made the usual compulsory order.

Egypt's Electrical Imports

BELOW appear values in Egyptian pounds (par value= £1 0s. 6d.) of Egypt's electrical imports last year; the grand total was £E635,000 as compared with £E879.000 in 1931. The figures are extracted from the recently issued official returns, but these do not give details throughout the electrical group, as in the previous year, of the countries of origin of the goods. Where this information is given it is included in the table, which also shows the increase or decrease compared with 1931. Belgium has become a more active competitor in this market.

	1932. Thous. £E.	Inc. or dec. as compared with 1931. Thous. £E
Generators, motors and transformers—		
1,000 kg. and over. Total	88	— 26
50–1,000 kg. Total	56	— 6
15–50 kg. Total	12	+ 4
Under 15 kg. Total	9	—
Batteries and accumulators—		
Total	32	+ 4
Carbons—		
Total	2	+ 1
Submarine and underground insulated cable—		
Total	94	+ 15
From United Kingdom ...	7	— 4
„ Belgium	50	+ 40
„ France	12	— 10
„ Germany	13	— 16
Other insulated wire and cable—		
Total	27	— 16
Fans—		
Total	2	— 4
Radio valves—		
Total	7	+ 2
Lamps—		
Total	39	— 13
From United Kingdom ...	8	+ 4
„ Austria	3	— 6
„ Germany	3	— 5
„ Holland	11	— 4
Radio apparatus—		
Total	60	+ 14
From United Kingdom ...	13	—
„ Germany	7	+ 1
„ United States ...	26	+ 7
Electro-medical apparatus—		
Total	9	— 4
Elec. signalling apparatus—		
Total	2	— 4
Other telegraph and telephone apparatus—		
Total	8	— 48
From United Kingdom ...	7	— 39
„ Sweden	1	— 8
Domestic appliances—		
Total	5	— 2
Elec. porcelain, glass, etc.—		
Total	3	—
Insulating tubes—		
Total	3	— 3
Other electrical apparatus—		
1,000 kg. or over. Total...	22	— 36
From United Kingdom ...	14	— 36
„ Germany	7	— 6
250–1,000 kg. Total...	9	— 36
10–250 kg. Total...	66	— 72
From United Kingdom ...	14	— 39
„ France	7	— 14
„ Belgium	23	+ 18
Less than 10 kg. Total...	78	— 5
From United Kingdom ...	15	— 9
„ France	12	— 4
„ Germany	27	+ 11
„ United States ...	—	— 14

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

B.E.A.M.A.'s Coming-of-Age

Like the industry that it represents, the B.E.A.M.A. has grown almost beyond recognition since the year 1911. It was at that date that the British Electrical and Allied Manufacturers' Association as we know it to-day began to take shape. It was preceded by the National Electrical Manufacturers' Association, part of which actually formed the nucleus of it. Still earlier there were other movements such as the Plant Manufacturers' Association and little groups which met at Winchester House and elsewhere to take united action regarding particular difficulties. Those were the days when the "trade," for manufacturers and importers met together, was feeling its way toward some sort of representative organisation which would be capable of dealing with the ever-increasing problems of a much troubled but rapidly growing industry. Mr. D. N. Dunlop, B.E.A.M.A.'s first director, has continued at the helm from 1911 down to date, and he and Mr. V. Watlington share the responsibilities of that office to-day. The sixty-page book "Twenty-one Years" which has just been issued to celebrate B.E.A.M.A.'s coming-of-age (1911-1932) therefore marks also the twenty-first "official" birthday of Mr. Dunlop, and it is fitting to remark that to him belongs much credit for tactfully handling many difficult situations, and turning many very awkward corners. If we may say so, the book that lies before us brings the reader more closely into touch with the organisation and its personnel and membership than any of its previous publications. It has a full story to tell, and we refrain from singling out any of its separate activities for special mention. It gives a full list of its members and is embellished with numerous photographic reproductions of their products.

"Sabotage" at Muscle Shoals Plant

Allegations of sabotage, both "constructive" and actual, at the Muscle Shoals hydro-electric plant on the Tennessee River in Alabama, are being made by Government investigators, says the New York correspondent of the *Manchester Guardian*. There are two chief criticisms in the indictment, of which the first is that one of the great auxiliary dams was planned by engineers in the Hoover Administration to be 20ft. lower than it should be for efficient operation. The other allegation says that private power companies operating part of Muscle Shoals under lease have "misused" equipment in violation of the War Department regulations. A searching investigation is expected, during which Mr. Patrick J. Hurley, Secretary for War under Mr. Hoover, and perhaps Mr. Hoover himself, will be summoned to testify as witnesses.

A Still Larger B.I.F.

To meet increased demands by exhibitors, important extensions and re-arrangements of the British Industries Fair grounds and buildings at Castle Bromwich have been authorised by the Council of the Birmingham Chamber of Commerce, which is responsible for organising the Birmingham Section of the Fair. The Fair Management Committee of the Chamber has also decided to make an admission charge of 2s. for trade buyers attending the Birmingham Section in 1934. Hitherto buyers have been admitted to the Birmingham Section without charge, although for the first time buyers were charged 2s. for admission to the London Section of the 1933 Fair. An official announcement issued by the Committee states that provisional bookings of space by exhibitors for the Birmingham Section of the 1934 Fair are 37 per cent. greater than corresponding bookings for the last Fair. Of a total available indoor space of 244,362 sq. ft., 177,907 sq. ft. has been provisionally booked already. Plans have now been approved having as an ultimate objective a permanent exhibition building with a total indoor area of 1,000,000 sq. ft., of which 500,000 sq. ft. will be available for exhibits, and extensions are to be put in hand immediately to add 55,000 sq. ft. of indoor area, of which 30,000 sq. ft. will be let to exhibitors in time for next year's Fair. The additional space to be provided for the 1934 Fair will be set aside for the electricity, gas, building and engineering groups in which congestion has become especially marked.

The G.E.C.'s New Stores

An extraordinarily large stores has recently been opened by the General Electric Co., Ltd., at Witton, Birmingham. The new stores has been necessitated by the steady increase of

General view of the new G.E.C. stores at Witton

output which has outgrown the accommodation available at the old stores at the Magnet Works, Landor Street, the latter being now only used for the more bulky articles, such as domestic and industrial cookers, baking ovens, heavy heating equipment, electric furnaces, &c. The new building consists of a single storey only, and occupies a total area exceeding 80,000 sq. ft. The receiving and despatch departments are situated at opposite ends of the building, so that all material enters at one end and ultimately goes out again at the other. The main offices occupy a section towards the centre of the building and consequently are easily accessible for all parts of the organisation. Both the general office and the stores are divided into sections which correspond generally with the various selling departments of the company, this system considerably simplifying and speeding up deliveries.

Lamp Import Duties

The Import Duties Advisory Committee gives notice that it has under consideration an application for an increase in the import duty on complete electric filament lamps of all kinds, whether in bulb or tubular form, and whether gasfilled or not. Any representations which interested parties may desire to make should be addressed to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, Westminster, S.W.1, not later than June 19th.

Guernsey Customs Duties

The Import Duties (No. 3) Order, Bailiwick of Guernsey, dated April 10th, made by the Board of Administration imposes customs duties on certain goods imported with effect from April 12th. These include electric wires and cables, telegraph, telephone and wireless apparatus, certain classes of electric carbons, electric lighting appliances and fittings (other than glass bulbs for electric filament lamps), batteries and accumulators, electric bell apparatus, cooking and heating apparatus, meters, and parts and accessories, on which a duty of 20 per cent. *ad valorem* has been imposed.

Conditions in Northern Africa

A report on economic conditions in Algeria, Tunisia, and Tripolitania has just been issued by the Department of Overseas Trade. While Algeria and Tripolitania have on the whole

not suffered from the effects of the world crisis so severely as other countries, Tunisia is stated to be still in the most acute difficulties and the adverse balance of trade is steadily increasing. With regard to future trade British manufacturers are advised that it is absolutely necessary to cut their prices to the lowest possible figure, at any rate to begin with, in order to gain a footing in the market.

A Philips Factory in Denmark

It is reported that owing to the restrictive import duties, the Philips Lamp Co., of Eindhoven, Holland, has decided to manufacture electric lamps, radio apparatus and valves at a factory lately acquired near Copenhagen, where, initially, employment will be found for about 100 persons.

The Norwegian Radio Market

There is a good demand for radio receiving sets of first-class quality in Norway, says a Department of Overseas Trade report, and there is a tendency to employ the multi-valve type of set with built-in dynamic speaker; radio-gramophones are not much used. In spite of the depreciation in sterling,

By the use of low-pressure tubular and concealed lighting, C. C. Wakefield & Co., Ltd., have obtained some very artistic effects in their new showroom at Wakefield House, Cheapside, E.C.2. A painting outside the window of two airplanes illuminated by a blending of day and artificial light is remarkably realistic

British manufacturers, with one or two exceptions, are unable to compete with American, Dutch, Swedish and German producers for the following reasons: (1) Their production is usually on too small a scale; (2) their valves are too expensive; (3) patent royalties already paid in the United Kingdom have to be paid again in Norway, whereas the Americans pay only 2½ per cent. royalty on exported sets.

Duties on Carbon Electrodes

On the recommendation of the Import Duties Advisory Committee, the Treasury has issued an order which comes into operation to-day, exempting carbon electrodes of certain sizes from the 10 per cent. duty which is levied on the general group of electrical goods, in addition to the general *ad valorem* duty. The electrodes affected are carbon electrodes (other than amorphous carbon electrodes and arc lamp carbons) within the following dimensions:—(*a*) Slabs in length exceeding 960 mm. and not exceeding 1,040 mm.; in width exceeding 168 mm. and not exceeding 190 mm.; in thickness exceeding 48 mm. and not exceeding 52 mm. (*b*) Rods in length exceeding 288 mm. and not exceeding 364 mm.; in diameter exceeding 48 mm. and not exceeding 52 mm.

Marine Electrical Service

In just over twelve months during which the newly formed electrical service department of the International Marine Communication Company, Ltd., has been available to shipowners, it has already had placed under its care the electrical installations of nearly 130 ships and has in hand a contract for the complete electrical outfit of a new vessel now building. It is announced that the Department has assumed responsibility for all the electrical work on board ships handled for repairs by Messrs. William Beardmore & Co., Ltd., Liverpool. It has also received the contract for the complete installation and supply of electrical material for the new *Gorgon*, which is now being built for Messrs. Alfred Holt & Co. (Blue Funnel Line) at Dundee.

Works Visits

Among recent visitors to the works of Mavor & Coulson, Ltd., to see conveyors, loaders, and coalcutters under construction, forty members of Babcock & Wilcox, Ltd.'s Staff Association were particularly interested in the means of testing rotors for running (dynamic) balance, which ensures correct balance, even at high speed. Another piece of test-bed apparatus which was appreciated was the explosion chamber in which flameproof plant is tested by the explosion of gas within it. Skeletons showing the moving parts of the "Samson" and low-seam "Samson" were inspected, and many conveyor driving gears under construction, one for driving two hundred yards of conveyor up a gradient of one in three-and-a-half. A new coalcutter was seen on crawler mountings for underground "trackless mining." A "movie" show depicted the M. & C. "Joy" loader at work underground.

New Electrical Showrooms

The Ormskirk Electric Supply Co., Ltd., and the Lancashire Electric Power Co. are now having erected in Park Road, Ormskirk, alongside the offices and works of the two companies, a new electrical showroom. This will be equipped in the most up-to-date style, and will have facilities for displays and demonstrations of appliances likely to be of interest to agriculturists, such as water-boilers, heating methods, and various classes of machinery for use on the farm.

New showrooms and offices are to be erected for the Leicester Electricity Department in Market Street.

Local Exhibition

Designed to interest farmers and their families, the exhibition of appliances organised by the Preston Corporation and now being held in Garstang, is very comprehensive; the goods on view comprise not only those suitable for the kitchen, but also for the farm, workshop and dairy, in addition to miscellaneous apparatus of particular interest to owners of poultry farms, refrigerators, grinding machines, &c.

Social Events

The association football team of Messrs. Frederick Smith & Co., Salford, is to be congratulated on its very successful season, having won the League Championship and Silver Cup in the Manchester Amateur League as well as the P.M. Oliver Cup in the Manchester Amateur Combination.

The annual competition for the G. P. Dennis trophy in aid of the benevolent fund of the Institution of Electrical Engineers was played on the links of the Royal Liverpool Golf Club at Hoylake on May 24th, when 117 players took part. The trophy was again won by Mr. O. M. Robson with a score of two up. Prizes were also given to winners of the bogey and foursomes competitions. There were seventy-four present at the dinner, which was presided over by the chairman, Mr. A. Cecil Livesey, who was supported by the captain of the Royal Liverpool Club, Mr. James Pegram. Mr. Pegram presented the prizes.

The annual amateur sports and gala of the London establishments of the General Electric Co., Ltd., will be held on June 10th at the company's sports ground, Preston Road, Wembley.

The annual golf match between members of the staff of Ferranti, Ltd., and the Metropolitan-Vickers Electrical Co., Ltd., took place recently on the course of the Cavendish Club, Buxton, when the Metropolitan-Vickers team won and thus gave Ferranti, Ltd., the privilege of entertaining them to supper after the match.

Trade Announcements

Mr. H. C. Dillworth, electrical engineer, of Evesham, has opened a new branch business at Ross-on-Wye.

Associated Contracts, Ltd., has moved its offices to Columbia House, Aldwych, W.C.2.

The Wenham Lighting Corporation, Ltd., is removing tomorrow (Saturday) to 3 and 4, Henry Street, and 4, Brownlow Mews, W.C.1 (telephone: Holborn 0121 and 0122).

Messrs. Robert Dempster & Sons, Ltd., Elland, Yorks, have opened an office at 16, Queen Anne's Gate, S.W.1, with Mr. S. Langford as their London representative.

Recent Contract

Tussaud's Cinema, Marylebone Road, W.1, has recently been equipped with special amplifying apparatus as a means of assisting patrons who are deaf. Earphones are obtainable from the attendants in the theatre free of charge. The installation has been carried out by Radio Aid, Ltd., 4, Iddesleigh House, Caxton Street, Westminster, S.W.1, who are issuing a limited number of free trial tickets to deaf people.

Development at Ipswich

The Ipswich and District Electrical Association has been formed with the object of furthering the development and applications of electricity within the area served by the Corporation. Mr. H. E. Blackiston, borough electrical engineer, is the first chairman, and Mr. H. Wintle, resident electrical manager of Messrs. Mann, Egerton & Co., Ltd., is the hon. secretary of the new association.

Patents in 1932

The report of the Comptroller-General of Patents, Designs, and Trade Marks for 1932 shows that the number of applications for patents received was 37,052, as compared with 36,117 in 1931. The number of provisional patents increased from 22,850 to 25,204, but the complete patents decreased from 22,838 to 19,834; there was also a decline from 21,949 to 21,150 in the number of patents sealed. The number of designs and trade marks registered was 19,887 and 6,060 respectively, as compared with 17,685 and 6,016 in 1931. The Comptroller-General says that in the electrical field attention is being devoted to the development of grid control systems for mercury arc and similar gaseous discharge apparatus, whereby such apparatus is afforded better regulation and protection

when used for rectifying alternating currents, and is rendered applicable for transmitting power from a d.c. to an a.c. network or between a.c. networks operating at different frequencies. The introduction of mains-operated electric clocks is responsible for activity in small synchronous motors. In the radio art, from the receiver end, developments of superheterodyne receivers to obtain increased selectivity and of automatic volume control to minimise fading are marked, and from the broadcasting end the problems of maintaining constant frequency of the carrier wave and of developing aerial systems which are non-directional are receiving attention. There is still much activity in connection with hot-cathode neon and other discharge lamps for general lighting and for advertisement purposes, and also in cathode-ray tubes for television and electrical measurement purposes. The photo-electric and like cell is finding applications in widely diverse fields, thus these cells are being used for automatically determining printing exposures in photographic printing, for controlling tools in engraving and other machines, and for maintaining registry of webs fed to printing-machines.

Under-water Floodlighting

The opening of the Hastings bathing pool on May 27th by Sir Humphry Rolleston revealed an original scheme of underwater floodlighting which has been developed by the General Electric Co., Ltd. In all there are installed some thirty-two G.E.C. floodlights of special design, equipped with 500-W "Osram" lamps, so arranged that they direct light from under the water, the units being so spaced and trained as to illuminate evenly the whole area, and to light up the swimmers. Access to the floodlights is provided by means of a tunnel which is constructed along each side of the actual pool. This is of sufficient size for an attendant to proceed along its entire length for the purposes of cleaning and adjusting the floods, or for lamp-changing purposes. Special structural designs were worked out by the Surveyor's Department of the Hastings Corporation in collaboration with the Illuminating Engineering Department of the G.E.C.

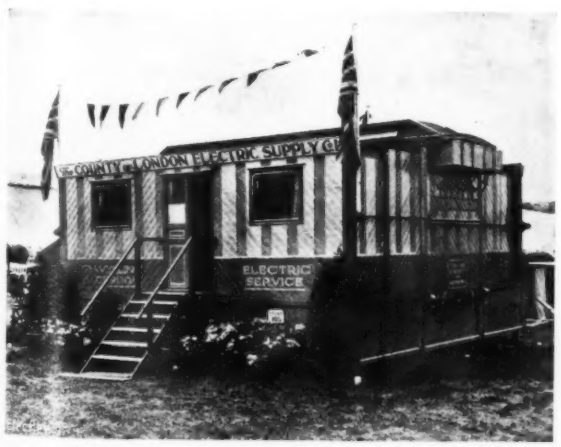
New Cinema-equipment Showrooms

Philips Industrial has established at 147, Wardour Street, W.1, showrooms for the display and demonstration of cinema equipment. An area of about 80 ft. by 40 ft. at the ground level serves mainly as a general showroom, and is almost wholly fronted by a large display window with a floor extending about 15 ft. from back to front. The display presents a good example of the art of window dressing, and is very well illuminated. The big window display is supported by two incorporated side show cases. A demonstration room in the basement, heavily draped and carpeted, offers luxurious comfort to the prospective purchaser, and its acoustics and lighting are most efficient. Tubular lamps between the wall drapings provide simple but very effective concealed lighting, and the effects are enhanced by dimming controlled from the projector room at the back. Views of the new premises appear on page 797.

Changes of Name

Walsall Instruments, Ltd., has changed its name to the Walsall Electrical Co., Ltd.

Messrs. S. Kalinsky (Aldgate), Ltd., 146, Theobalds Road, W.C.1, are now trading as London & Provincial Factors, Ltd.



The travelling showroom of the County of London Electric Supply Co., Ltd., at the Bath and West Show

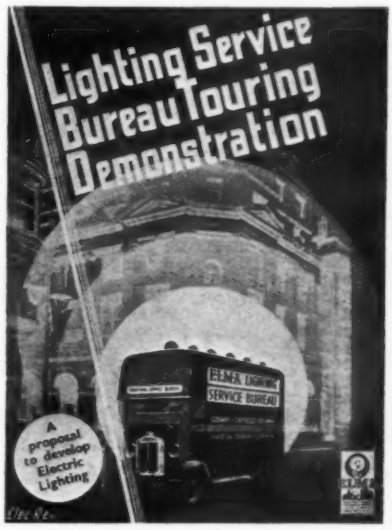
The name of the Potteries Electric Traction Co., Ltd., has been changed to the Potteries Motor Traction Co., Ltd., and the telegraphic address has been altered to "Omnibuses, Stoke-on-Trent."

A Lampholder Specification

A British Standard Specification for Edison screw lampcaps and holders is long overdue, for although there has been a specification for "Goliath E.S." caps and holders since 1919 there has been nothing dealing with the ordinary size of cap as used on 200-W lamps, or with the smaller sizes as used for projector lamps, Xmas tree lamps, torches, &c. A draft Specification dealing comprehensively with all the dimensions of four sizes of screw caps ("Goliath," medium, small, and miniature), together with dimensions for the corresponding holders, has recently been prepared by the British Standards Institution, and copies of this are available for criticism prior to final adoption. An important feature of the draft is the requirement that all lampholders of the two largest sizes are to be so constructed that it is impossible to touch live metal while inserting or withdrawing a lamp. Compliance with this requirement of "untouchability" is determined by means of a standard test finger, full details of which are given in the draft Specification, copies of which are available, reference C.D. (EL) 208, from the British Standards Institution, 28, Victoria Street, S.W.1, price 1s. 2d. post free.

The E.L.M.A. Touring Demonstration

The Electric Lamp Manufacturers' Association Lighting Service Bureau has for a number of years carried its gospel of more and better lighting into the provinces through the medium of lecture demonstrations mainly organised by the electrical trade. It has now developed more far-reaching methods whereby consumers in the provinces will be visited by a special Diesel vehicle that will enable them to see the following demonstrations recently on view at the Lighting Service Bureau: Full scale colorama—showing the possibilities of painting with light; a completely equipped demonstration shop window; floodlighting possibilities on a large-scale model building; illuminated cupboards, niches, and other conveniences for the home; a special demonstration enabling industrial lighting to be analysed; full ranges of lighting fittings for factories, shops, and offices; and demonstrations showing how light magnifies fine detail and assists the speed of vision. Local electrical traders are asked to provide a suitable lecture hall where the demonstrations can be set up for a period and the E.L.M.A. staff is prepared to give lectures and demonstrations to various classes of consumers. The vehicle is equipped with a 15-kW generator so that where a suitable supply cannot be provided electricity can be generated by the motor itself. The touring demonstration is offered free of charge to the local electrical industry for a period of 3-12 days, and facilities are available whereby equipment installed on the top of the vehicle can floodlight the front of the premises in which the demonstrations are being given. The demonstrations will be in charge of a competent lighting engineer, who is also a capable lecturer. This van will be on view at Bournemouth during the I.M.E.A. Convention.



The cover of an attractive brochure issued in connection with the E.L.M.A. touring demonstration scheme

G.E.C. Scottish Staff's London Visit

About 150 members of the staff of the G.E.C. branches at Glasgow, Edinburgh, Dundee, Aberdeen, and Inverness spent part of their spring holiday in London last week. Visits were paid to the Osram Lamp Works, Glass Works, and G.E.C. Research Laboratories at Wembley, and to Magnet House. A luncheon was arranged in honour of the visitors, Mr. C. Wilson, director of the Osram Lamp Works, occupying the chair, supported by Mr. M. J. Railing, Mr. P. J. Sims, Mr. Cullen, and others.

Advertisement Correction

Messrs. J. A. Crabtree & Co., Ltd., ask us to state that errors occurred in the list numbers in their last week's advertisement. The correct list numbers are as follows:—15-A 3-pin Lincoln switch-socket and plug, List No. 7475/7210; 15-A 2-pin, List No. 7465/7200; 5-A 3-pin, List No. 7435/7110; 5-A 2-pin, List No. 7425/7100.

Prices of Materials

Messrs. F. Smith & Co. report May 31st, Electrolytic copper bars and sheets, no change; electrolytic copper wire rods, £46, 5s. inc.; electrolytic copper h.c. wire, 7 7/16d., 7/8d. inc.; silicium bronze wire, 8½d., ¾d. inc.

Messrs. Edward Till & Co. report, May 31st: India-rubber, Para fine, 5½d., ½d. inc.

Messrs. James & Shakespeare report, May 31st: Copper bars (best selected), sheet and rod, £68, £3 inc.; English pig lead, £14 10s., £1 5s. inc.

Toronto Trade Commissioner's Visit

Mr. A. M. Wiseman, H.M. Trade Commissioner in Toronto, is now on leave in this country and will be available at the Department of Overseas Trade, 35, Old Queen Street, S.W.1, to interview United Kingdom trade associations and business firms. Mr. Wiseman will be prepared to discuss with trade associations, or with United Kingdom firms, who are contemplating an application for a review of duties by the Tariff Board under the United Kingdom-Canadian Trade Agreement made at Ottawa, the procedure with which, in the light of present information, it would be desirable for them to conform. Applications for interview should indicate the subject to be discussed and quote the reference No. C.Y. 4141.

New Catalogues and Lists

Watliff Co., Ltd., 175, Merton Road, Wimbledon, S.W.19.—Leaflets relating to commutator turning tools and cement.

British Fan & Electric Co., 21, Mount Pleasant, Rosebery Avenue, W.C.1.—A 1933 list of exhaust fans and regulators.

L. G. Hawkins & Co., Ltd., 30/35, Drury Lane, W.C.2.—A folder illustrating and describing the "Supreme" electric wash-boiler.

Electric Construction Co., Ltd., Bushbury Engineering Works, Wolverhampton.—A catalogue of two- and three-phase induction motors.

Shawndel Tool Co., 99/101, Regent Street, W.1.—Leaflets describing the Shawndel controlled "Flyer," a device for controlling the paying out of wire from a supply reel.

Drayton Regulator & Instrument Co., Ltd., West Drayton, Middlesex.—List No. 182b, relating to ring balance flow meters.

Negretti & Zambra, 38, Holborn Viaduct, E.C.1.—Publications entitled "Thermometric Lag" and "Installation and Maintenance of Instruments."

H. Church & Co. (Essex), Ltd., Queen Street, Chelmsford.—A booklet dealing with electrical equipment for the garden.

Peto & Radford, 50, Grosvenor Gardens, S.W.1.—A leaflet giving particulars of "Dagenite" accumulators for hire service.

G. W. B. Furnaces, Ltd., Elecfurn Works, North Road, Holloway, N.7.—Leaflets dealing with "Kleenard" open hearth hardening compound and "Nokase" anti-carburising mixtures.

Siemens & General Electric Railway Signal Co., Ltd., Central House, Kingsway, W.C.2.—An illustrated leaflet (No. 111) on directional rail contact.

Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.—A catalogue illustrating and describing "Aeroto" screw fans.

J. J. Eastick & Sons, 118, Bunhill Row, E.C.1.—A 328-page illustrated general catalogue of radio and electrical goods, the 1933 radio set catalogue, the February-March issue of the company's "Bulletin," and leaflets on "Eelex" short-wave convertors and modulated oscillators, and plugs and sockets.

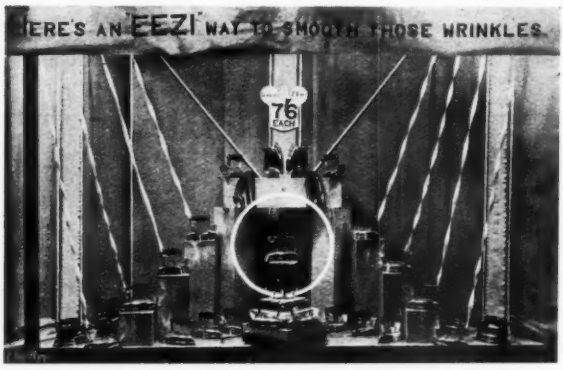
Electric Resistance Furnace Co., Ltd., 17, Victoria Street, S.W.1.—A brochure on the factors affecting the economies of electric heating.

Revo Electric Co., Ltd., Tipton, Staffs.—Publications relating to the 1933 season's electric fans.

Marconiphone Co., Ltd., 210-212, Tottenham Court Road, W.1.—A leaflet giving details of the new "Catkin" valves.

Thos. Firth & John Brown, Ltd., Atlas and Norfolk Works, Sheffield.—An illustrated brochure on stainless and heat-resisting castings.

J. & E. Hall, Ltd., Dartford, Kent.—A folder containing a



A special display of "Eezi" electric irons at the Leiston showrooms of the East Suffolk Electricity Distribution Co.

collection of illustrations relating to the Flohr system of escalators.

Electric Depôt, Ltd., Pritchett Street, Aston, Birmingham.—A leaflet dealing with adjustable lighting fittings for office use.

British Brown-Boveri, Ltd., 56, Victoria Street, S.W.1.—Leaflets illustrating and describing contactor type "L," and an individual drive for ring spinning frames and double frames, with squirrel-cage motors mounted on the headstock and step pulleys.

Runbaken Magneto Co., Ltd., 280, Deansgate, Manchester.—A publication giving particulars of a new ignition coil and condenser tester.

Mullard Wireless Service Co., Ltd., Charing Cross Road, W.C.2.—A broadsheet describing the company's new screened h.f. pentode valve.

Higgs Motors, Witton, Birmingham.—A pocket stock list (No. 152) of motors.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—The new season's literature (publications Nos. V.3, V.6558 and V.6560) relating to fans, and leaflet No. X.6546 describing an oven thermostat recently introduced by the company. Also a new edition of the company's catalogue (W.2) of wiring systems, and an illustrated list (No. S.F.1) of illuminated electric signs.

Radiolab Manufacturing Co., Sandridge Works, St. Albans.—A brochure describing the company's new radio valve and set tester.

British Oxygen Co., Ltd., Victoria Station House, S.W.1.—Catalogue section No. 6a, dealing with blowpipe equipment for brazing, soldering, heating, leadburning, paintburning, glass-working, &c.

Heyes & Co., Ltd., Water-Heyes Electrical Works, Wigan.—The May "Wigan Review," containing a description of "Wigan" flameproof electrical equipment.

Bruce Peebles & Co., Ltd., Edinburgh.—Leaflet No. 602, describing glass bulb mercury-arc rectifiers.

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.—Publication No. 7010/13, relating to motors of from 1/100 to 1 h.p.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, E.C.1.—An illustrated leaflet on cables for traffic control installations.

Bankruptcy Proceedings

J. Mellanby, electrical engineer, Mystery House, Cambridge Road, Waterbeach, Cambs.—At the first meeting of creditors held recently at the Official Receiver's office, Cambridge, a statement of affairs was submitted which showed gross liabilities of £4,408, of which £3,338 was expected to rank for dividend. The net assets amounted to £365, so that there was a deficiency of £2,973. Debtor attributed his failure to commencing business without free capital, losses in the reconstruction and restoration of premises, losses on contracts, and research and experimental work, bad debts and depreciation of plant. The matter was left in the hands of the Official Receiver as trustee.

J. O. Storey (J. Storey & Son), electrical engineer and wireless dealer, 227, Stockport Road, Ashton-under-Lyne.—Receiving order made May 24th on debtor's own petition. First meeting, June 2nd, at the Official Receiver's offices, Byrom St., Manchester. Public examination, June 26th, at the Town Hall, Ashton-under-Lyne.

E. Marsden, electrical engineer, 51, High Holme Road, Louth.—Trustee, Mr. J. F. Wintringham, St. Mary's Chambers, Great Grimsby, Official Receiver, released April 26th.

C. E. Pittman, electrical contractor and wireless dealer, 12, Station Road, West Croydon.—Last day for receiving proofs for dividend, June 6th. Trustee, Mr. H. T. Jones, 12, Rolleston Street, Salisbury, Official Receiver.

J. R. Lister (trading as Roland Radio), radio engineer, 6, Watford Way, Hendon.—An order of discharge, subject to a suspension of six months, was granted to this bankrupt on May 26th at the London Bankruptcy Court.

R. E. Lomas, electrical and radio engineer, 24, Tower Street, King's Lynn.—Trustee, Mr. J. L. Wilkinson, 41, Sidney Street, Cambridge, Official Receiver, released April 26th.

Company Liquidations

Mechanical & Electrical Engineering Co. (Birmingham), Ltd., Stafford Street, Birmingham.—At the meeting of the creditors held at the offices of Messrs. Corfield & Cripwell, 12, Cherry Street, Birmingham, the statement of affairs showed liabilities of £930 and assets amounting to £400. After allowing £22 for preferential claims, the net assets were £378, leaving a deficiency as regarded the creditors of £552. The issued capital of the company was £2,000, making a total deficiency of £2,552. The creditors decided to confirm the voluntary liquidation of the company, with Mr. W. Hand as liquidator, together with a committee of inspection.

Derby Accumulator Co., Ltd.—Winding up voluntarily. Liquidator, Mr. F. W. Farnsworth, 41, St. Mary's Gate, Derby.

Weiss, Biheller & Brooks, Ltd.—Winding up voluntarily. Joint liquidators, Mr. G. W. Bacon, Norfolk House, Laurence Pountney Hill, E.C., Mr. R. Wertheim, 5, Cleve Road, N.W., and Mr. H. Hildesley, 106, Rivermead Court, S.W.

Hewelectric, Ltd.—Winding up voluntarily. Liquidator, Mr. G. Dickinson, 32, Victoria Street, S.W.

Wallingford & District Electric Supply Co., Ltd.—Meeting, July 3rd at 11, Tothill Street, S.W., to receive an account of the winding-up by the liquidator, Mr. H. Fraser.

Baxter & Gaunter, Ltd. (old company).—Meeting, June 26th, at 8, Fredericks Place, Old Jewry, E.C., to receive an account of the winding-up by the liquidator, Mr. A. A. Lough.

Private Arrangements

A. S. Britton, electrical dealer, 425, Buxton Road, Stockport.—A meeting of creditors was held recently when a statement of affairs was submitted which disclosed liabilities of £482, all due to unsecured creditors, and assets estimated to realise £387, leaving a deficiency of £95. The debtor had no offer to submit, and it was resolved that he should execute a letter of authority in favour of Mr. A. Allen, of Stockport, authorising him to realise the assets and distribute the proceeds amongst the creditors.

N. L. Hodgetts, wireless and electrical dealer, 1, Hagley Road, Halesowen, Worcs.—A meeting of creditors was held recently when a statement of affairs was submitted which disclosed liabilities of £1,953, of which £1,882 was due to the trade, and assets estimated to realise £1,060, leaving a deficiency of £893. It was resolved to confirm a deed of assignment already executed in favour of Mr. W. H. Wyatt, Birmingham, as trustee with a committee of inspection consisting of the representatives of the Gothic Electrical Co., General Electric Co., Ltd., and the Colmore Depôt.

Rayette Radio, Ltd., 128, King Street, Hammersmith, London, W.6.—At a meeting of creditors held recently a balance-sheet was submitted which showed liabilities to sundry creditors of £3,323 and assets totalling £2,056. There was a debit on the profit and loss account as at February 1st, 1932, of £131, to which had to be added the net loss on trading since that date to January 31st last of £1,345. An offer was made of 2s. 6d. in the £, payable by five monthly instalments, the first instalment of 6d. to be paid on October 1st next. This was not accepted, and it was resolved that the shareholders should be asked to pass the necessary resolutions to put the company into voluntary liquidation.

Electricity Supply

Lighting, Domestic, Power

Accrington.—SUCCESSFUL YEAR.—The Corporation Electricity Department reports a net profit of £7,600 for last year. Despite the adverse state of trade, there was a record consumption of electricity, the amount sold exceeding 22,000,000 kWh as compared with 19,000,000 kWh in the previous year.

Alsager.—PUBLIC LIGHTING DURING SUMMER.—Complaint has been made to the Urban District Council of the public lighting supply being cut off during the summer months. As a result, the Council has decided to make an offer to the Electricity Distribution, North Wales & District, Ltd., to take a supply during the summer at a charge of 25 per cent. below that for the winter months.

Altrincham.—GRID PROGRESS.—Work is about to commence on the last stage of the Central Electricity Board's transmission line from Altrincham to Stockport. The line will complete the Board's "Cheshire Ring," which forms a circuit embracing Stockport, Macclesfield, Alderley, Knutsford, and Altrincham, and is a continuation of the line from Alderley Edge, through Knutsford.

Ashford.—OVERHEAD LINE INQUIRY.—A Ministry of Transport inquiry was held last week into the Urban District Council's application to erect a 33-kV overhead line from the grid station at Shorncliffe to the Council's generating station. It was stated that of 155 poles to be erected, wayleaves had been agreed in respect of 119. The scheme is estimated to cost £30,000 and will give the Council a bulk supply. Most of the few objectors to the proposed lines crossing their land failed to appear.

Barking.—MAINS AND SERVICES.—The Electricity Committee has received sanction to the borrowing of £20,616 for mains and services.

Basingstoke.—OIL TAX RAISES ELECTRICITY CHARGES.—The chairman of the Electricity Committee announced recently that in the near future there would be an increase in the price of electricity owing to the recent imposition of a tax of 1d. per gallon on fuel oil.

Birmingham.—ELECTRICITY DEPARTMENT'S INCREASED SURPLUS.—The accounts of the Electricity Department show a surplus for last year of £183,600, as compared with £175,300 in the previous year, notwithstanding the fact that reductions of power charges representing £45,000 were made during the latter half of the year. A report by the secretary and commercial manager (Mr. E. J. Jennings) states that during April 1,026 additional premises were connected, the new business representing an additional load of 8,700 lamps and of 3,500 h.p. in the power section.

Blackburn.—MAINS EXTENSIONS.—The Town Council has applied for sanction to the borrowing of £30,000 for future expenditure on mains and services.

Bognor Regis.—COUNCIL HOUSE INSTALLATIONS.—In response to a petition from 255 tenants of Council houses for the installation of electricity, the Urban District Council has intimated that there is no objection to the tenants making their own arrangements with the Bognor Gas & Electricity Co.

Bridlington.—BATHING BY FLOODLIGHT.—The Town Council has approved a scheme of colour floodlighting for the benefit of night bathers during the summer.

Brighton.—MAINS EXTENSIONS.—Mains are to be extended at the cost of £1,484.

Chesterfield.—RECORD OUTPUT.—During the year ended March 31st, 1933, an additional 1,453 consumers were connected, representing an additional demand of 3,189 kW; the total number of consumers is now 13,418. A total of 12,612,653 kWh was sold (a record for the undertaking), and there was a net profit of £5,689 in spite of reductions amounting to approximately £4,900. Further reductions in charges are to be considered. The number of electric cookers, fires, irons, wash-boilers and other domestic apparatus connected to the system is now 10,105, representing 13,642 kW out of a total of 30,517 kW total load connected.

Coventry.—NEW PLANT.—The Electricity Committee is seeking sanction to a loan of £16,500 for new plant and alterations to buildings.

Denny and Dunipace.—CHEAPER ELECTRICITY.—The Town Council is reducing the price of electricity by ½d. per kWh.

East and West Ham.—NEW DOMESTIC TARIFF.—A 1d. per kWh all-in tariff for small domestic consumers has been introduced, and is being jointly advertised, by the East and West Ham Electricity Departments. In West Ham the new charge is confined to prepayment-meter consumers, but in East Ham it is available as an alternative to the ordinary domestic two-part tariff. A cooker is installed upon an initial payment of 5s., and a guaranteed minimum consumption is required, in West Ham this being 20 kWh a week and in East Ham 360 kWh a quarter. All other charges, including the hire and maintenance of the cooker, are included in the price of 1d. per kWh, and Mr. J. W. Townley, West Ham's electrical engineer, tells us that already there are indications that the scheme will prove extremely popular.

Eccles.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £962.

Finchley.—EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £1,200, and recommends that permission should be given to the North Metropolitan Electric Power Supply Co. to supply the Halliwick Manor Estate.

France.—INCREASING USE OF WATER HEATERS.—As the result of a questionnaire sent out to over 500 electricity supply undertakings it is stated that, whereas in 1931 there were relatively few electric water heaters in use, at the end of last year there were 4,200 installed in Paris, 2,450 in the Paris suburbs, and 12,673 in other parts of the country, a total of 19,323.

The public buildings at Barcelona illuminated in honour of the "Queens of Beauty" from all parts of Europe who were on their way to compete in the international beauty competition held recently in Madrid

Glasgow.—OUTPUT OF DALMARNOCK STATION.—The Central Electricity Board has stated that it cannot see its way to make any alteration in the revised programme for 1933 under which the Corporation, since April 1st last, is generating approximately the same amount of electricity as it was previously producing, pending the result of the test which is at present being carried out.

ELECTRICITY SUPPLY BILL.—At a recent meeting of the Parliamentary Bills Committee there was submitted a copy of the Electricity (Supply) Bill, as introduced into the House of Lords, the purpose of which is to amend the law in England and Wales with respect to the supply of electricity. After considering a report by the general manager of the Electricity Department, it was agreed to approve the Bill generally and to recommend that steps should be taken with a view to having the scope of the Bill extended so as to apply it to Scotland.

PROGRESS DURING APRIL.—Under the Electricity Department's scheme 110 houses were wired in April, making a total of 37,409; hired appliances now number 18,520.

MAINS EXTENSIONS.—Distributing mains costing £553 are to be installed.

Glendale (Northumberland).—ELECTRICITY SCHEME FOR WOOLER.—A scheme for supplying Wooler with electricity has been approved by the Rural District Council, and now awaits the sanction of the Wooler Parish Council.

Gretton.—STREET LIGHTING.—The Parish Council is negotiating with the Mid-Lincolnshire Electric Light Co. for lighting the village streets.

Halifax.—YEAR'S WORKING.—During the year ended March 31st last the electricity undertaking made a net profit of £31,947, the highest figure since 1929-30. Electricity sold amounted to 37,390,076 kWh, a net increase of 3,178,351 kWh as compared with the previous year. Reductions in tariffs are under consideration.

Huddersfield.—REDUCED CHARGES.—The Town Council has made the following reductions in electricity charges:—Alternative charge for domestic supply, the standing charge to be 12½ per cent. of the rateable value up to £25, and 7½ per cent. from £25 to a maximum of £60. House and shop combined, standing charge to be 20 per cent. up to £50, and 10 per cent. beyond. Alternative charge for single-phase consumers other than domestic, first 100 kWh per kW of maximum demand, 4d. per kWh; beyond, 1d., less a discount of 1 per cent. per 500 kWh above 20,000 kWh per half-year, with a

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maximum discount of 30 per cent. Commercial heating and cooking, first 200 kWh per kW at 1d. instead of 300 kWh. After-hour shop-window lighting, from 1½d. to 1d. per kWh.

Inverness.—ASYLUM ELECTRICITY SCHEME REJECTED.—The Town Council has decided not to sanction the loan of £18,000 which the Asylum Committee proposed to raise in order to carry out its electricity scheme.

Irlam and Cadishead.—LOAN APPLICATION.—The Electricity Commissioners have informed the Urban District Council regarding its application for a loan of £36,010 for electricity purposes that, as the undertaking has now been transferred to the Stretford and District Electricity Board, they are unable to sanction further borrowing by the Council, and that the application for the loan will have to be made by the Board.

Langwathby (Cumberland).—LIGHTING OF VILLAGE.—The Parish Council has approved a plan submitted by the Mid-Cumberland Electricity Co. showing the proposed routes of the electricity mains for lighting the village.

A neat type of concrete lamp standard at Enfield West Underground Station

Leeds.—HIRE AND HIRE-PURCHASE SCHEMES.—The Electricity Committee has deferred consideration of suggestions for extending the hire and hire-purchase schemes to include small cookers, grillers and other small domestic appliances, and has asked the manager to obtain information from other towns on the subject.

ASSISTED WIRING.—Application is to be made for sanction to a loan of £30,000 for assisted wiring.

Lithuania.—HYDRO-ELECTRIC DEVELOPMENTS.—The Lithuanian Minister of Communication stated recently that the commissions appointed to consider the construction of hydro-electric stations were now completing their work. Two commissions had already finished, and only the economic commission was still sitting. The Water Service was still making investigations for the construction of hydro-electric stations on the small rivers, and for their linking-up. The question of construction would, however, be approached very cautiously, as the work would involve a heavy expenditure.

Lochmaben.—PUBLIC LIGHTING.—The Town Council has decided to adopt electricity for public lighting. The conversion from gas is to be carried out by Callender's Cable & Construction Co., Ltd.

London.—HAMMERSMITH.—It is proposed to extend the shop-lighting tariff (£10 per kW of lighting installed per annum, plus ¼d. per kWh) to include heating and power supplies not only to shops but to other business premises (excluding factories and workshops), subject to the fixed charge being limited to a minimum of £5.

ST. MARYLEBONE.—The Borough Council has been asked to approve the expenditure of a further £2,500 on wiring tenement properties, £276 to be spent on wiring Nightingale Street Buildings. Ring mains costing £277 are to be installed at Goodwood Court and Crawford Place dwellings.

The Baths Committee has instructed the electrical engineer to prepare schemes for electrically heating the Town Hall and proposed new baths at Shouldham Street.

POPLAR.—The Electricity Committee is to provide electricity supplies to 177 L.C.C. dwellings in West Ferry Road at a cost of £580.

SUPPLY BREAKDOWN.—Shortly before midnight on Monday a fault on one of the high-voltage cables of the Charing Cross Electricity Supply Co., Ltd., caused a dislocation of the new Trafalgar Square traffic signals and some of the lighting in the Mall. The company states that the reports appearing in many of the daily papers were grossly exaggerated, the whole supply having been restored within forty minutes.

Luton.—LOAN.—The Town Council has applied for sanction to a loan of £21,873 for new plant for the sub-stations at Turner's Knoll and New Bedford Road, and the provision of feeders, switchgear, kiosks, and transformers.

Middlesex.—ELECTRIC COOKING AT SANATORIUM.—The County Council Health Committee contemplates spending £320 on installing electric cooking apparatus in the three ward kitchens at Calre Hall Sanatorium.

Morecambe.—NEW WIRING REGULATIONS.—The borough electrical engineer has been instructed to refuse in future a supply of energy by means of a sub-service to premises except where the services are back to back with the same division wall, or flats where directly above each other are supplied from a service at the base of the building.

MAINS EXTENSIONS.—Mains extensions costing £643 are to be carried out by the Electricity Committee.

Northern Ireland.—ENNISKILLEN UNDERTAKING PURCHASED.—The Electricity Commissioners of Northern Ireland have purchased the Enniskillen electricity undertaking, the shareholders receiving £2 8s. 6d. for each £1 share.

KILDARE STREET LIGHTING.—The public lighting of Kildare has been taken over by the Electricity Supply Board.

Oxford.—MAINS EXTENSIONS.—The Housing Committee has accepted the offer of the Oxford Electric Co., Ltd., to extend mains to the Cutteslowe extended housing estate and install services to each house without any cost to the Corporation.

LOANS.—Application is being made by the Electricity Committee for sanction to the borrowing of £12,600 for h.p. cables, £10,000 for switchgear, and £3,000 for transformers.

Plymouth.—ELECTRICITY DEPARTMENT'S LARGE SURPLUS.—The municipal electricity undertaking shows a net surplus of £26,938 for the past year.

Russia.—THE NIZHNESVIR HYDRO-ELECTRIC STATION.—We are informed from a Soviet source that the first turbines of the Nizhnesvir hydro-electric power station are expected to be in operation by November next. When completed, the station will produce 500 million kWh a year. There will be four turbines each of 37,500-h.p. capacity, three being constructed in Sweden and one in Leningrad. The generators were all built in Russia, and over 85 per cent. of the equipment will be of Soviet make. The transmission lines, 240 km. in length, will operate at 220,000 V, and is the first line of such a high voltage in the U.S.S.R. Meanwhile, plans are being completed for the Verkhnesvir station in the upper section of the river. The capacity of this station will be 40 per cent. greater than that of the Nizhnesvir station.

Shap.—SUPPLY IN THE AUTUMN?—It is possible that the Westmorland Electricity Supply Co., Ltd., may change its plans and supply Shap in time for the next lighting season. Originally the company proposed to supply the town early next year.

Southend-on-Sea.—ANNUAL REPORT.—The annual report of Mr. A. C. Johnson, the electrical engineer and manager, states that electricity sold during the year ended March last is estimated at 25 million kWh, an increase of 4¼ million kWh over the previous year. This advance is greater than the aggregate of any three preceding consecutive years and is said to be the result of the change-over policy and of the domestic electrification policy inaugurated at the first electrical exhibition held in 1932. The increase can be apportioned as follows (in million kWh):—Domestic, 1.4; water heating, 0.6; business, 1.0; industrial, 0.9; transport, 0.6. The cost of generation plus bulk supply is reduced to ¼d. per kWh, as compared with 0.64d. in the previous year. The total costs, including capital charges, were less than during the year ended March, 1930, notwithstanding an increase of nearly 50 per cent. in output. The total cost per kWh was approximately 1.85d., as compared with 2.36d. in 1931-32. The revenue shows continued expansion in spite of large reductions in tariffs which are reflected in an average decrease of approximately 0.45d. per kWh sold.

Stoke-on-Trent.—CHANGE-OVER.—The Electricity Committee is to proceed with the change-over of the supply from d.c. to a.c. in the Brick Kiln Lane area, Etruria, at an estimated cost of £560.

STREET LIGHTING.—The Electricity Committee is to consider proposals for the electric lighting of streets when mains are being extended to new streets or areas.

CHURCH HEATING.—It is proposed to install tubular heating at the Methodist Church, Trentham.

Wem.—COUNCIL HOUSE INSTALLATIONS.—The Urban District Council has decided to permit tenants of Council houses to install electricity at their own expense.

West Stanley.—LOANS SANCTIONED.—Sanction has been received by the Council to the borrowing of £2,000 for wiring installations, £1,000 for meters, and £154 for domestic apparatus.

Weymouth.—LOANS SANCTIONED.—The Town Council has received sanction to loans of £492 for mains, and £422 for a sub-station and equipment.

Traction

Argentina.—NEW BUENOS AIRES TUBE RAILWAY.—The foundation stone marking the commencement of construction of the Retiro-Constitucion section of the new system of underground railways for Buenos Aires was laid recently by the President. The new tube, which will be approximately five miles in length, will serve to connect the terminus of the Buenos Aires Great Southern Railway at Plaza Constitucion with the terminal stations of the Central Argentine, the Buenos Aires and Pacific and Central Cordoba Railways at Retiro, and will intersect with the existing tube of the Anglo-Argentine Tramway Co. at Plaza Mayor in front of Government House which is situated about midway between the two termini of the new tube. The new line will also cross the Lacroze Subway near the Florida Station. It is expected that the first section of the line will be completed by June, 1934.

Australia.—ELECTRIC TRAINS FOR PORT MELBOURNE PIER.—Electric train services are to be run on Station Pier, Port Melbourne, and the erection of the overhead equipment is to be carried out immediately.

Belgium.—RAILWAY ELECTRIFICATION PROGRESS.—Electric trains are now running on the line of the Société Nationale

des Chemins de Fer Vicinaux, between Braine l'Alleud and Wavre, a distance of about thirteen and a half miles, and also between Courtrai and Menin (eight miles). Electric traction has also been inaugurated recently on the seven-mile line between Rumpst and Lierre, and between Verviers, Dolhain and Eupen. Over 750 miles of the company's system have now been electrified.

Brighton.—YEAR'S WORKING.—There was a decrease from £9,260 in 1931-32 to £6,087 last year in the net surplus of the Tramways Department.

Darlington.—TROLLEY-BUS SCHEME DEFERRED.—The Transport and Electricity Committee has deferred consideration of a scheme for extending the Haughton trolley-bus services until the completion of the widening of Stockton Road.

France.—RAILWAY ELECTRIFICATION CONTRACTS.—The Paris-Orleans Railway Co. has just placed contracts for the electrification of the railway between Vierzon and Brive. The order for the equipment of the necessary sub-stations has been divided between the Société Alsthom, the Ateliers de Jeumont and the Compagnie Générale d'Electricité.

Ilford.—TRAFFIC SIGNALS.—The Highways Committee is to install automatic traffic signals costing £650 at the junction of Eastern Avenue and Ley Street.

Italy.—TROLLEY-BUSES FOR MILAN.—A service of trolley-buses is to be introduced in the Milan district between Loreto and Dergano.

Japan.—PROPOSED UNDERGROUND LINE.—The construction of an underground railway costing 800,000 yen is proposed by the I.G.R. Nagoya Railway Bureau.

Leicester.—BOW-COLLECTOR INVESTIGATIONS.—The Fischer bow-collector system for trams is being investigated by the Tramways and Omnibus Committee.

Manchester.—TRAFFIC SIGNALS.—The Highways Committee is to install eight further sets of traffic signals at a cost of £1,490.

Morocco.—MAIN-LINE ELECTRIFICATION.—It is expected that the electrification of the Meknes-Fez section of the Tangiers-Fez Railway will be completed within the next four months. Very steep gradients and water troubles with the steam locomotives were the principal reasons for the conversion to an electric system operating at 3,000 V d.c. Seven 1,450-h.p. locomotives are on order.

Sunderland.—NEW TRAMS.—Sanction has been received by the Town Council to a loan of £21,806 for the purchase of twelve new trams.

United States.—A HIGH-SPEED OIL-ELECTRIC TRAIN.—The Union Pacific Railroad Company is to build a streamlined light-weight motor-driven passenger train which will have a maximum speed of 110 m.p.h. and will maintain an average speed of 90 m.p.h. *The Times* says that the train will be completed within six months, and is expected to cost $250,000. It will consist of three cars coupled together with one truck between two cars. The first car will contain a 600-h.p. internal-combustion engine burning a distillate non-explosive fuel. This will provide the necessary power through an electric generator and motors on the wheels of the forward truck.

AN ILLINOIS RAILWAY PROPOSAL.—A Bill to prohibit railroads within cities of over 1,000,000 inhabitants from using any other motive power but electricity has recently been introduced for the second time in the Illinois Legislature. It is sought to enforce an Act to come into force in 1935, with a penalty of $1,000 dollars for each day of non-compliance.

Communications

Australia.—BASS STRAIT TELEPHONE CABLE.—While on a visit to Tasmania, Mr. Perkins, Australian Minister for the Interior, told the Bass Strait Telephone Committee at Launceston that the proposal for a telephone cable across the Bass Strait to connect Tasmania with the mainland would receive his support. He promised to place the Committee's proposal before the Postmaster-General.

Ceylon.—COLOMBO-LONDON TELEPHONE.—It is understood that the Government of Ceylon is considering a scheme for linking Colombo with the India-England wireless telephone service, and that in the Telegraph Department's budget estimates is included a sum intended to cover half the cost of a new cable between Dhanushkodi and Tataimannar. The existing cable connection between these two places is old and unsuitable for telephony. The new cable will be able to carry telephony and telegraphy. Half the cost of the new cable will be borne by the Indian Government. Despite the considerable work which is necessary upon the Bombay-Madras and Madras-Dhanushkodi lines before they will be able to carry the Colombo-London service, it is hoped that it will be possible to inaugurate the new service within the next two years.

China.—RADIO SERVICE TO ENGLAND.—The new Government radio station at Chenju is expected to establish direct radio communication with England before the end of the summer. The wireless equipment is being paid for out of the proceeds of a £50,000 loan from the British Boxer Indemnity Refund, and consists of two transmitting and four receiving sets from the British Marconi works, says the *Chinese Economic Bulletin*.

Edinburgh.—POLICE TELEPHONE BOXES.—There was inaugurated on May 29th a new police box system in Edinburgh, designed to speed up communications. There are 140 boxes.

Exeter.—RADIO RESEARCH.—In connection with investigations on the propagation of short radio waves, research is proceeding in the Washington Singer Laboratories of the University College of the South West, Exeter, into the magnetic and electric properties of land and water. A recent gift of special magnetic and optical apparatus has made possible the investigation and correlation of the magnetic, electric, and optical properties of electrolytes.

Great Britain.—RADIO RELAY EXCHANGES.—"Radiomains," Mr. Paul Taylor's Kettering relay system, is now in operation and giving dual programmes.

The Luton relay station of Broadcast Listeners' Service has sustained damage by fire.

The Highways Committee of the Ilford Corporation is making inquiries in other localities in which systems of broadcast relaying have been installed and a meeting of the Committee will be called to consider the matter when information is available.

At the last meeting of the Whitburn (West Lothian) Town Council Messrs. Greig Bros., Bathgate, asked permission to erect overhead wires and wires on brackets affixed to Council houses in connection with the proposed establishment of a relay service. It was decided not to grant permission at present.

India.—RADIO TELEPHONY.—Since the Anglo-Indian radio-telephone service was established an average of five calls per day has been made from Bombay. A regular service between India and Australia became available to the public on May 22nd, and Egypt, Palestine, and South Africa are also to be linked with India.

New York.—WIRELESS SERVICE TO SHANGHAI.—A new direct radio-telegraph circuit connecting the United States with China has been opened between the Mackay Radio and Telegraph Co.'s San Francisco station and that of the Chinese Government Radio Administration at Shanghai. The new circuit is to operate twenty-four hours a day, and all kinds of telegraph services are available.—*Reuter's Trade Service* (N.Y.).

Somerset.—WEST REGIONAL TRANSMITTER.—The B.B.C.'s new West Regional transmitter came into full operation on May 28th, on a wavelength of 309.9 metres (968 kc.), and the Cardiff and Swansea transmitters will now be withdrawn. The new transmitter has been radiating reception-test transmissions since April 24th, and there is evidence that it is being received satisfactorily. It was described in our issue of May 12th.

South Africa.—NEW BROADCASTING STATION.—Capetown and Western Province are to be provided by the end of this year with what will probably be the most up-to-date broadcasting station in the Union as a result of the African Broadcasting

Much interest is being taken in the trolley-bus experiments at Bournemouth, where several different types of vehicle are being tried out. The above is an A.E.C. fifty-seater model specially fitted with choke coils to reduce radio interference

Corporation's decision to erect a new transmitting station at Milnerton, where use will be made of the Wireless Companies' 600-ft. masts which have been standing idle since the advent of the beam system. The equipment is being manufactured by the Marconi Company. The studio will be transferred to a new building, which is at present being erected at the corner of Darling and Plein Streets.—*South African Engineer and Electrical Review.*

AUTOMATIC TELEPHONY.—A new automatic telephone exchange has been opened at Orange Grove, Johannesburg. It has taken over 3,000 telephones from three manually operated exchanges. This completes the present scheme of conversion in the Johannesburg area, which has been in progress about two years. Only three other exchanges in this area remain to be converted. The first of these will not be undertaken for about eighteen months, when the new Post Office building is expected to be ready for the installation of automatic equipment.

Switzerland.—AUTOMATIC TELEPHONY.—The telephone service between Zurich and Basle has lately been changed over to automatic operation.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Angus.—June 21st. County Council. Various works, including electrical installation, at extension of the County Buildings, Forfar. Master of works, Municipal Buildings, Forfar.

Ardrossan (Ayrshire).—June 9th. Town Council. Various works, including electric lighting, at housing scheme. Joint town clerks (10s. 6d. deposit).

Australia.—MELBOURNE.—July 24th. Victorian State Electricity Commission. Porcelain insulators for all voltages. Secretary, 22-32, William Street, Melbourne.

Cheadle & Gatley.—June 16th. Electricity Department. 250-kVA transformer. (See this issue.)

Dover.—June 30th. Corporation. Transformer chambers. (See this issue.)

Dundee.—June 20th. Corporation. Thermal storage system for Transport Department depôt. (See this issue.)

Egypt.—CAIRO.—June 27th. Ministry of the Interior. Electrical distribution network to supply Samallout and Maassaret Samallout. (A.X. 11780).*

August 3rd. Overhead and underground electrical networks. (A.Y. 11817.)*

June 15th. Electrically driven pumping set with output of 650 litres per sec. against a total head of 8 metres. (G.X. 12562.)*

June 6th. Ministry of Public Works. Pumping station and plant at Zagazig. (G.X. 12567.)*

Fife.—June 5th. County Council. Electric lighting installation in twenty houses. Messrs. W. Williamson & Hubbard, architects, Kirkcaldy.

Govan.—June 10th. Clyde Navigation Trust. Stores (including electrical). Stores superintendent, 1, Graving Dock, Govan.

London.—FULHAM.—June 27th. Electricity Department. Power station extensions, including 12,500-kVA turbo-alternator and 66-kV remote-controlled switchgear. (May 19th.)

METROPOLITAN WATER BOARD.—June 16th. General stores, including electric lamps. Chief engineer, 173, Rosebery Avenue, E.C.1.

Lossiemouth.—June 13th. Various works, including electrical and heating, in connection with the restoration of the High Church. Messrs. Geo. Bennett Mitchell & Son, architects, 1, West Craibstone Street, Bon-Accord Square, Aberdeen.

Manchester.—June 10th. Town Hall Extension Special Committee. Electric lighting fittings, automatic telephone installation, synchronised clocks, wiring, &c., at Manchester Central Library. (May 26th.)

June 13th. Pilot and telephone cables between Sale and West Didsbury sub-stations. (May 26th.)

New Zealand.—WELLINGTON.—July 18th. Posts and Telegraphs Department. Secondary cells. (A.X. 11803.)*

July 5th. 4,250 telephone instrument and switchboard cords. (A.Y. 11812.)*

Northern Ireland.—BELFAST.—June 5th. Water Board. Electrically driven pumping plant (about 16 h.p.) for Ballykine Works. Mr. W. I. Quinn, secretary, Water Office, Belfast (deposit £1).

Nottingham.—June 13th. Mental Hospital and Mental Deficiency Committee. Installation of electric lighting, &c., at Aston Hall. City engineer and surveyor, Guildhall (deposit £2).

Reading.—June 19th. Education Committee. Electric lighting installation and fittings at the Alfred Sutton Central School, Wokingham Road. Borough surveyor (deposit £2 2s.).

Rhondda.—June 26th. Two 150-kVA three-phase static transformers. (See this issue.)

South Africa.—JOHANNESBURG.—June 22nd. City Council. Ten miles of 0.4 in. diam. copper trolley wire. (G.X. 12600.)*

PARYS.—June 23rd. Municipal Council. Generating and distribution equipment. (A.X. 11808.)*

Uruguay.—MONTEVIDEO.—State Electricity Works. Fifty-two 6,000-V. 3-phase, 50-cycle distribution transformers. (A.Y. 11821.)*

July 25th. 17,700 single- and three-phase house service meters. (A.Y. 11822.)*

Worcester.—June 12th. Electricity Department. Switchgear. (See this issue.)

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Birmingham.—Education Committee. Accepted. Electric lighting improvements at Allcock Street, Moseley Road, Mary Street, and Nelson Street School.—H. Pratt, Ltd.

Brighton.—Watch Committee. Recommended. Pocket wireless receiving sets for police, with spare batteries (£443).—Wireless Telephone Co.

Erith.—Urban District Council. Accepted. Additional equipment for lighting the Northumberland Heath shopping centre (£84).—General Electric Co., Ltd.

Glasgow.—Corporation Housing Committee. Accepted. Supplies for one year. Electrical fittings and cables.—Drake & Gorham (Who'esale), Ltd.; General Electric Co., Ltd. Electrical work at Balmore Road housing scheme extension (£498).—F. McCready.

Guildford.—Town Council. Accepted. Installation of electricity in Westborough School (£230).—A. Grove.

Irlam & Cadishead.—Urban District Council. Accepted. Steel poles for main road electric lighting (£780).—British Mannesman Tube Co., Ltd.

London. — PADDINGTON. — Highways Committee. Recommended. Vehicle-actuated traffic signals, Oxford Terrace (£38) and Elgin Avenue (£415).—Automatic Electric Co., Ltd.

Manchester.—Highways Committee. Accepted. Vehicle actuated traffic signals at Varley Street and at Church Street.—J. H. Holmes & Co., Ltd.

Transport Committee. Accepted. Cadmium-copper trolley wire.—R. Johnson & Nephew, Ltd.

Electricity Committee. Accepted. Supplies for 12 months. Lamp shades.—Anglin & Co.; Wholesale Fittings Co., Ltd.; Hailwood & Ackroyd, Ltd. Electric kettles.—Premier Electric Heaters, Ltd. Time switches.—Venner Time Switches, Ltd. A.c. motors.—British Thomson-Houston Co., Ltd.; Laurence, Scott & Electromotors, Ltd. Electricity meters.—Ferranti, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.; Aron Electricity Meter, Ltd. Cable supplies.—Hackbridge Cable Co., Ltd.; Macintosh Cable Co., Ltd.; Standard Telephones & Cables, Ltd.; Metropolitan Electric Cables, Ltd.; Connollys (Blackley), Ltd.; British Insulated Cables, Ltd.; Pirelli-General Cable Works, Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Derby Cables, Ltd.; Johnson & Phillips, Ltd.; Mersey Cable Works, Ltd.; Ward & Goldstone, Ltd.; Edison Swan Cables, Ltd.; W. T. Glover & Co., Ltd.

Salford.—Electricity Committee. Recommended. Electric cookers for 12 months.—Simplex Electric Co., Ltd. One 5,000-kVA transformer (£1,400) and switch panel (£559).—Metropolitan-Vickers Electrical Co., Ltd. Switchboard (£1,158).—Switchgear & Cowans, Ltd. Supply and laying feeder cables, &c., from Frederick Road sub-station to Blackfriars sub-station (£10,896).—W. T. Glover & Co., Ltd. Mercury-arc rectifier equipment (£530).—Bruce Peebles & Co., Ltd.

Tynemouth.—Town Council. Accepted. Mercury-arc rectifier.—Bruce, Peebles & Co., Ltd.

Forthcoming Events

Institute of Transport.—June 3rd-17th. Summer meeting on the White Star liner *Homeric*.

Tramways and Light Railways Association.—June 8th and 9th. Leeds. Annual congress.

Incorporated Municipal Electrical Association.—June 12th-17th. Bournemouth. Annual convention.

Associated Municipal Electrical Engineers (*Great Britain and Ireland*).—June 14th. Bournemouth. Annual meeting.

Overhead Lines Association.—June 16th-18th. Bristol. Summer meeting.

Conference Internationale des Grandes Réseaux Electrique.—June 16th-24th. Paris.

Municipal Tramways and Transport Association.—June 21st. Blackpool. Annual conference.

Institution of Electrical Engineers.—June 22nd. Natural History Museum, S.W. 6.30 p.m. Conversazione.

World Power Conference.—June 28th-July 4th. Stockholm.

Electrical Contractors' Association.—July 5th-7th. Torquay. Annual conference.

A New Gas-engined Power Station

THE Société Cockerill, of Seraing, near Liége, Belgium, has recently completed a somewhat novel power station for the iron and steel works of the Société d'Ougrée-Marihaye. The plant comprises two 7,000-kW gas engines with flywheel alternators, four boilers fired by the exhaust gases from the gas engines, and a 2,500-kW turbo-generator set in which part of the steam is utilised, the remainder of the steam being employed for the running of turbo-blowers. The gas engines, which are operated by waste gases from the blast furnaces, are of the horizontal four-cylinder double-acting type; they have a bore and stroke of 1,500 by 1,500 mm. and run at 94 r.p.m. The alternators, which generate 50-cycle a.c. at 6,600 V, have rotors weighing 160 tons keyed directly on the engine shaft. The exhaust gas-heated boilers, which were constructed by the Etablissements Jacques Piedboeuf, of Jupille, Liége, are installed in the open air; they are horizontal and have each a heating surface of 4,305 sq. ft., each being capable of generating 5,250 kg. of steam per hour at a pressure of 213 lb. per sq. in. Tests carried out by the Cockerill Co. on the plant show it to have an all-round efficiency of 86.73 per cent., later raised to 89.75 per cent., these figures being attained after taking into account stoppages for cleaning, etc., and variations in the demand for electric power, the efficiency under a power-utilisation coefficient ranging from 93.13 to 94.26 per cent. and under a time-utilisation coefficient from 92.88 to 95.23 per cent. M. H. Lesueur, of the Cockerill Co., in describing the plant and tests in the *Revue Universelle des Mines*, claims that where blast furnace gas is available in large quantities 60 per cent. more electric power can be generated by gas engines and recuperation plants than would be the case if the available gases were used only in a steam-operated plant.

Notes

Mining Electrical Engineers

The annual general meeting of the South Wales branch of the Association of Mining Electrical Engineers was held at Cardiff on May 27th, the branch chairman, Mr. J. B. J. Higham, presiding. Mr. H. J. Norton, hon. secretary, reported that the year had been a successful one in spite of difficult times. The membership at March 31st was 277. Mr. J. Jones (Pyle) had been successful in obtaining the branch prize for his paper on "Fault Protection." Mr. Higham was re-elected branch president, Mr. A. C. MacWhirter hon. treasurer, and Mr. H. J. Norton hon. secretary. The ballot for the election of four new members of council resulted in the election of Messrs. H. Pritchard (Aberaman), C. A. Smiles (Cardiff), J. Jenkins (Porth), and C. W. Harvey (Cardiff).

Firemen and the Grid

If during a fire near a grid line water from a hose pipe comes into contact with the overhead conductors, is the fireman directing it likely to receive a shock due to electrical leakage down the water jet? To answer this question the Institute of Fire Engineers arranged with the Central Electricity Board for an experiment to be carried out by Chief Officer Dane, of the Croydon Fire Brigade, who is president of the Institute. Jets of water from nozzles of various diameters were directed on to a 132-kV grid line at the Croydon electricity works. The nozzles were held in a wooden tripod to which leakage instruments were attached and insulating and earthing precautions were taken. The tests showed that special precautions are not necessary when working 40 ft. or more from 132-kV conductors with a nozzle $\frac{5}{8}$ in. or less in diameter. With a nozzle diameter of $\frac{3}{4}$ in. or more the distance should be at least 60 ft. At shorter distances it is recommended that the nozzle should be earthed, that a hose should be used with copper wire extending along its whole length, or that the firemen should wear rubber gloves.

Standard Specification for Turbine Oils

The long-awaited British Standard Specification for Turbine Oils has been published by the British Standards Institution as No. 489-1933. While it is realised that in its present form the Specification may exclude occasional oils which would yet give satisfactory service, but with which no actual experience has been recorded, the limits set are such that the Specification will not admit any oils other than those which experience to date has shown to be suitable for turbine lubrication. The limits set for certain characteristics, as well as the methods specified for their determination, in connection with which some controversy exists, are being considered by a committee whose findings will determine the justification or otherwise for any modification in these limits in subsequent, revised, editions of the Specification. Copies may be obtained from the Publications Department of the Institution, 28, Victoria Street, S.W.1, price 2s. 2d. post free.

Appointments Vacant

Professor of electrical engineering for University College, Nottingham.

Engineer for Hillingdon County Hospital.

Assistant mechanical and electrical engineers for the Air Ministry.

Engineer and manager for the Westmorland and District Electricity Supply Co., Ltd.

Foreman for Sudan Railways power station.

(See our classified advertisements.)

Reinforced Concrete Lamp Columns

Many engineers prefer steel to cast-iron lamp columns on the grounds that they entail less risk of breakage and consequent injury to pedestrians, although they corrode more quickly. Reinforced concrete columns are not subject to either of these drawbacks. Mr. P. Robinson, city electrical engineer, Liverpool, was one of the first to appreciate the economic possibilities of concrete and has now over 1,000 lamp columns of this type in his area, many of which have been on test for two years. Mr. A. J. Waring, electrical engineer, Felixstowe U.D.C., reports that one of his concrete columns was painted by mistake; he thus found that one coat of paint on the concrete surface is better than three coats on cast iron and is apparently more lasting. Concrete Utilities, Ltd., Ware, has now developed a wide range of lamp columns to meet almost every requirement. Illustrations of various types of columns in use at Maidstone, Scarborough, and Liverpool appear on page 778.

A 270-b.h.p. Diesel-electric Locomotive

The Diesel-electric locomotive recently completed by Messrs. Harland & Wolff, Ltd., to the order of the Belfast & County Down Railway is required for general service, its particular aptitude being for branch-line service up to 50 m.p.h. with shunting between trips. It will also haul a 200-ton goods train up a gradient of one in a hundred at 16 m.p.h. The locomotive is of the six-wheel rigid-frame type with motors on two axles; the total weight is 29 tons and the adhesive weight 21 tons. The tractive effort at starting is 9,450 lb. The driver's cab is fitted with two controllers to give easy one-man operation from either side.

The Harland-B. & W. two-cycle eight-cylinder engine develops 270 b.h.p. at 850 r.p.m.; the idling speed is 315 r.p.m., and there are two intermediate speeds. The cylinders are charged by a geared rotary-scavenge blower. Each cylinder is fitted with an airless-injector fuel pump. The motors are of the Laurence Scott "Emcol" totally enclosed non-suspended type driving the axles through spiral gearing. The d.c. dynamos and exciter, mounted on the same shaft, as well as all the control gear, have been manufactured by Harland & Wolff to their own designs. An "Exide" battery provides current for starting the engine and for auxiliary services, including the exhauster for the vacuum brake system. Lubrication of the axles is of the Isothermas self-regulating oil-circulation type. The locomotive has been designed and constructed under the personal supervision of Mr. Crosthwaite, locomotive engineer of the Belfast & County Down Railway. An illustration appears on page 779.

A Synthesis of Technical Literature

For many years past an International Committee, set up by the Seventh Congress of Applied Chemistry held in London in 1909, has been analysing the technical publications of the world with a view to collating new information in relation to electricity, magnetism, and electro-chemistry. Twenty-nine countries are represented, the British representatives being Prof. A. Egerton, Sir R. T. Glazebrook, Mr. G. W. C. Kaye, O.B.E. (N.P.L.), Prof. W. C. Lewis, and Sir Frank E. Smith. The Committee issues annual volumes, and also prepares from time to time an extract from each under the title "Données Numeriques d'Electricité, Magnetisme et Electro-Chemie" (Gauthier-Villars et Cie., 55, Quai des Grands Augustins, Paris. 803 pp., £2 8s.). The latest of these extracts relates to the years 1927-28 and 1929 and may be considered as indispensable to all engaged in scientific research. The two years are dealt with separately but on parallel lines, each being divided into five main sections (electricity, dielectric constants, magnetism, ionisation and electronics, and electro-chemistry) with numerous sub-sections.

Each item of information, many of which are accompanied by diagrams, contains a reference to the article from which it has been drawn, the name of its author, and the year and page of the periodical in which it appeared, or is marked with a reference to a corresponding number in a bibliography accompanying each section. The bulk of the volume is printed in French, but everything possible has been done to render it understandable to scientific workers in all countries, to secure which a corresponding text in English has been included in many instances, this applying also to the general index which precedes each main division.

Welding in Shipyards

The application of electric welding to shipbuilding was the subject of a recent conference at Edinburgh when, at the invitation of the Shipbuilding Employers' Federation, representatives of the shipyard trade unions met the executive committee of the Employers' Federation. Mr. J. B. Hutchison, who acted as chairman for the employers, explained the technical development of the process, and indicated that in the near future still further progress was likely. He emphasised the importance of the development of welding in this country proceeding as rapidly and as smoothly as possible on economical lines in order that competition with other shipbuilding nations might be successfully faced. The Employers' Federation, says *The Times*, recognised that rearrangements in existing methods and practices might be involved, affecting practically all classes of workmen in the shipyards. A considered scheme to develop electric welding was submitted to the union side. Mr. Sherwood, speaking for the unions, stated that the employers' statement was of such a far-reaching character that it would be necessary for the union representatives to arrange for its consideration by their full executive, and in many cases also by area committees and branches. The conference was adjourned to allow the unions the opportunity of taking the steps indicated.

Fatalities

An inquest was held at Carbis Bay (Penzance) on May 24th into the death of John Pearce James, a jobbing gardener, of Lelant, who received a fatal electric shock in a garden, where he was found grasping a metal pipe in both hands. Mr. Arthur Charles Owen, distribution engineer of the West Cornwall Electric Supply Co., said that since the accident, in company with Mr. K. Preston, H.M. Electrical Inspector of Factories, he had examined the wire in that particular pipe and the connection. Where the two wires entered the pipe at the top of the pole the insulation of one 220-V conductor had perished and wire had come into contact with the pipe, making it "alive." He had not heard of any leakages in that particular row of houses before. The system was tested in April last and there was no leakage then. The pipe was out of the ground so as not to disturb the garden at this particular spot. In returning a verdict of "Death by misadventure," the jury said they considered that James met his death by an electric shock from a live wire owing to its being insufficiently earthed. They added to their verdict a rider that they considered the West Cornwall Supply Co. had been negligent. Replying to a question from the coroner the foreman said the jury did not think there was any criminal negligence attaching to the company or any person.

While working on a dynamo on May 24th at the Honey Lane Nurseries, Waltham Abbey, Ray Edward Fagerlund, a foreman, received a fatal electric shock.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

I.E.E. Council Nominations.—The following have been nominated by the Council of the Institution of Electrical Engineers for the vacancies which will occur on September 30th:—President: Mr. P. V. Hunter. Vice-president: Mr. R. P. Sloan. Hon. treasurer: Mr. P. Rosling. Ordinary members of the Council: Messrs. P. Dunsheath, W. McClelland, C. G. Morley New, E. E. Sharp and Johnstone Wright. Associate member of the Council: Mr. E. W. Moss. Associate of the Council: Mr. V. Z. de Ferranti.

Mr. F. Newey

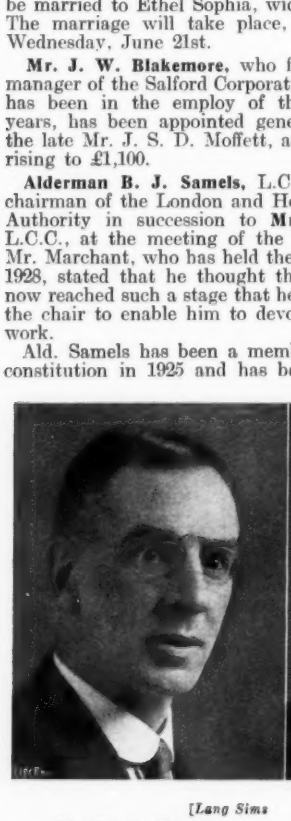
Mr. F. Newey, electrical engineer at Long Eaton since 1921, has been recommended for the appointment of electrical engineer to the Lincoln Corporation. Mr. Newey is a member of the Executive Committee of the Council of the Incorporated Municipal Electrical Association, a member of the Consultative Committee of the Central Electricity Board for Central England, and of the Executive Committee of the Association of Municipal Electrical Engineers. Mr. Newey read a paper on "The Organisation of Small Undertakings" at the I.M.E.A. Convention held last year, an abstract of which appeared in our special "Power Number" of June 17th last.

Mr. R. P. Sloan, C.B.E., of Craiglea, Westfield Drive, Gosforth, Newcastle-on-Tyne, chairman of the North-Eastern Electric Supply Co., Ltd., than whom there is none more highly esteemed in the electricity supply world, is engaged to be married to Ethel Sophia, widow of the late William Hoar. The marriage will take place, very quietly, at Staines, on Wednesday, June 21st.

Mr. J. W. Blakemore, who for ten years has been deputy manager of the Salford Corporation transport undertaking, and has been in the employ of the Corporation for thirty-two years, has been appointed general manager in succession to the late Mr. J. S. D. Moffett, at a salary of £900 per annum, rising to £1,100.

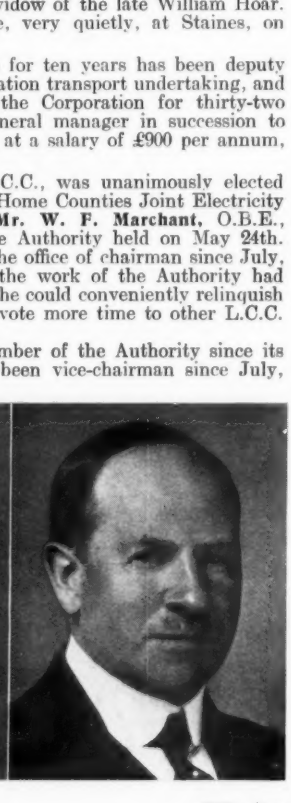
Alderman B. J. Samels, L.C.C., was unanimously elected chairman of the London and Home Counties Joint Electricity Authority in succession to **Mr. W. F. Marchant,** O.B.E., L.C.C., at the meeting of the Authority held on May 24th. Mr. Marchant, who has held the office of chairman since July, 1928, stated that he thought the work of the Authority had now reached such a stage that he could conveniently relinquish the chair to enable him to devote more time to other L.C.C. work.

Ald. Samels has been a member of the Authority since its constitution in 1925 and has been vice-chairman since July,



[*Lang Sims*

Mr. W. F. Marchant



[*Miles Kaye*

Alderman B. J. Samels

1928, and chairman of the Finance Committee since December, 1927. He has a long and distinguished record of public service, being a member of the London County Council and chairman of the Public Control Committee of that body. He was Mayor of Hammersmith for three years, from 1926-1929, and was chairman of the Metropolitan Boroughs' Standing Joint Committee in 1931. For many years he has been a member of the London and Home Counties Traffic Advisory Committee and chairman of the District Joint Board for the Electricity (Supply) Industry (Greater London Area).

Herr Carl Zipernowsky, for many years associated with Ganz & Co., of Budapest, and for thirty-one years a professor at the Budapest Technical High School, recently celebrated his eightieth birthday. He is leading Hungarian electrical engineer, and his name is known throughout the world in connection with the development of electric transformers.

Mr. James J. Hyde, 36, Bedford Street, Belfast, has been appointed Northern Ireland representative of the Metropolitan Electric Cable & Construction Co., Ltd.

Mr. H. A. Stonham is the new chairman, and **Mr. H. Featherstone** the vice-chairman, of the Tunbridge Wells branch of the Electrical Contractors' Association.

Mr. N. Evans, of the staff of the Metropolitan-Vickers Electrical Co., Ltd., of Manchester, who was recently married to Miss Curzon, of Withington, has been presented by his colleagues in the motor test department with a case of fish knives and forks.

Mr. C. J. M. Smith, a member of the staff of the Stratford-on-Avon Electricity Co., Ltd., who has taken up an appointment at the Shakespeare Memorial Theatre, has been presented by his colleagues with an inscribed gold stop-watch.

Mr. A. Hepburn, who succeeds Mr. Sydney Burns as president of the North of England branch of the Association of Mining Electrical Engineers, is chief engineer to Messrs. Straker & Love, the Durham colliery owners. He has been prominently associated with the branch since its inception in 1911. For many years he was lecturer in mechanical and electrical engineering at the Johnston Technical School, Durham.

Mr. H. H. George, B.E., A.M.Inst.C.E., A.M.I.E.E., of Associated Electrical Industries (India), Ltd., Calcutta (at present on leave in England) was married on May 20th to Marjorie, daughter of Mr. and Mrs. H. W. Wellard, of Rusholme, Manchester.

Sir Henry Lyons was elected president of the Institute of Physics at the annual meeting held on May 23rd, and **Prof. A. O. Rankine** was elected vice-president.

Lord Melchett has consented to accept the presidency of the British Science Guild in succession to **Sir Samuel Hoare,** whose three-year term of office ends in June, 1933. Lord Melchett will be elected at the annual general meeting to be held in the Mansion House on June 19th, at which the Lord Mayor of London will preside.

[*Elliott & Fry*

Lord Queenborough, chairman of Siemens Bros. & Co., Ltd., whose speech at the annual meeting of the company is reported in our "City Notes"

Obituary

Mr. H. O. Davies.—The sudden death occurred on May 27th of Mr. H. O. Davies, the outside departmental engineer in the employ of the Swansea Corporation electrical undertaking. Mr. Davies, who was forty-five years of age, was an associate member of the Institution of Electrical Engineers, was last year's chairman of the West Wales section of the Electrical Power Engineers' Association, and for years was the secretary of the Swansea Sub-Centre of the I.E.E.

Mr. H. H. Cutler.—We regret to learn of the death at Miami, Florida, U.S.A., on May 20th, of Mr. H. H. Cutler, who was the founder of the well-known Cutler-Hammer Manufacturing Co. of Milwaukee and New York. He was considered the "father" of the electric motor control industry in the U.S.A., and was a recognised authority on the subject. Mr. Cutler retired many years ago from active control of the company, but continued in a technical advisory capacity and remained a prominent figure in American and English electrical engineering circles to the end of his life.

Mr. P. Gowlett.—The death has occurred of Mr. Peter Gowlett, of Rogers & Gowlett, electrical engineers, of High Street, Watford. He was seventy-three years of age, and entered the business of the late Mr. James Rogers in 1882, becoming a partner in 1900. He was a member of the Electrical Contractors' Association and of the Institute of Heating and Ventilating Engineers.

Mr. W. C. Davey.—Mr. W. C. Davey, senior, who for over fifty years was in the service of Messrs. Strode & Co., and in later years in his son's business (W. C. Davey & Co.), died on May 27th in his seventy-sixth year.

Mr. W. G. Bickmore.—The death occurred on May 21st, at the age of seventy-seven years, of Mr. William George Bickmore, of Mildmay Road, Chelmsford, who was for forty-seven years on the staff of Crompton & Co. and Crompton Parkinson, Ltd., of Chelmsford.

Mr. J. Guild.—Mr. James Guild, superintendent of Perth electricity station, died on May 23rd at the age of sixty-five years. Mr. Guild had been associated with the Electricity Department since the opening of the station in 1901. After serving his apprenticeship as an engineer with the Caledon Shipbuilding and Engineering Co., Dundee, he served for a period at sea and subsequently was employed at Dundee power station.

Wills.—Sir Henry Royce left estate of the gross value of £110,000.

Sir James McKechnie, M.I.Mech.E., F.S.A., of New York, formerly a director of Vickers, Ltd., and director of Canadian Vickers, Vickers-Petters, and Centrifugal Separators, left estate in England valued at £10,226.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Lewiphones, Ltd.—Private company. Registered May 24th. Capital, £300 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical amplifiers, accumulators and batteries, wireless sets and components, &c. The permanent directors are: J. E. Lewis and W. J. Lewis, both of Gladstone Villa, Narberth. Solicitor: W. Cyril Oliver, 25/26, Royal Building, Fisher Street, Swansea.

Miller Bros. (Doncaster), Ltd.—Private company. Registered May 24th. Capital, £500 in £1 shares. Objects: To carry on the business of electrical engineers and general electrical installation contractors, &c. The directors are: C. W. Miller and Margaret Miller, both of 10, Laburnum Road, Doncaster, Wm. A. Miller and Ruby Miller, both of 35, Grove Hill Road, Doncaster.

Advance Electrical Co., Ltd.—Private company. Registered May 25th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, electrical, radio, refrigeration and general engineers, &c. The directors are: Mabel L. A. Jones and Beatrice A. Jones, both of 33, Maderia Park, Tunbridge Wells, Kent. Registered office: 44, Monson Road, Tunbridge Wells, Kent.

Neon Portable Units, Ltd.—Private company. Registered May 25th. Capital, £100 in £1 shares. Objects: To carry on business as manufacturers, producers and assemblers of batteries and other parts and accessories relating to illuminated and other signs and other electrical apparatus, &c. The directors are: N. Moss, 29, Shoot Up Hill, N.W.2; H. N. Moss, Manor Vane, Station Road, Thames Ditton; and A. E. Moss, Green Trees, Queen's Drive, Thames Ditton. Registered office: 845-850, Salisbury House, London Wall, E.C.2.

J. F. Foggo, Ltd.—Private company. Registered in Edinburgh May 26th. Capital, £2,000 in £1 shares. Objects: To carry on the business of electricians, electrical, mechanical, motor and radio engineers, &c. The directors are: J. F. Foggo, 74, Dalkeith Road, Edinburgh, and J. R. W. Adamson, 1, Danube Street, Edinburgh. Secretary: R. Boyack. Registered office: 31, South Castle Street, Edinburgh.

Soundcraft, Ltd.—Private company. Registered May 26th. Capital, £300 in 200 5 per cent. cumulative preference shares of £1 and 2,000 ordinary shares of 1s. each. Objects: To carry on the business of dealers in, designers and manufacturers of, apparatus for use in all branches of telephony, telegraphy, television and sound-recording and reproducing systems, &c. The permanent directors are: S. K. Wilson, 12, Whitehall Road, Harrow, and two others.

Davis's Stores (Liverpool), Ltd.—Private company. Registered May 27th. Capital, £1,000 in 900 7½ per cent. preference and 100 ordinary shares of £1 each. Objects: To carry on the business of manufacturers of, agents for and dealers in wireless apparatus, electrical fittings, apparatus and accessories, &c. The directors are: X. S. Davis, 5, Limedale Road, Mossley Hill, Liverpool, and two others. Solicitors: J. Jaffe & Co., 27, Brazennose Street, Manchester.

Grandlite Electric, Ltd.—Private company. Registered May 26th. Capital, £210 in £1 shares. Objects: To carry on the business of agents for and dealers in luminous and other signs, radio goods, &c. The directors are: F. A. Walton, Harburton Cottage, Princess Road, Swanage, and three others. Solicitors: Preston, Redman, Neville Jones & Howie, Wareham, Dorset.

Returns of Electrical Companies

Baird Television, Ltd.—Capital, £875,000 in 200,000 "A" ordinary, 2,100,000 preferred ordinary, and 1,200,000 deferred ordinary shares of 5s. (increased from £825,000 by the creation of 200,000 "A" ordinary shares on March 20th, 1933). Return dated February 6th, 1933. 2,100,000 preferred ordinary and 1,200,000 deferred ordinary shares taken up. £315,000 paid on 1,050,000 preferred ordinary (including premium of 1s. per share), £562,500 considered as paid on 1,050,000 preferred ordinary and 1,200,000 deferred ordinary). Mortgages and charges, nil.

India Rubber, Gutta Percha & Telegraph Works Co., Ltd.—Capital, £1,250,000 in 750,000 ordinary, 250,000 preferred, and 250,000 unclassified shares of £1. Return dated January 4th, 1933. 750,000 ordinary and 250,000 preferred shares taken up. £1,000,000 paid. Mortgages and charges: £400,000.

Southern Brazil Electric Co., Ltd.—Capital, £507,800 in 650,000 ordinary shares of 10s., and 182,800 10 per cent. cum. preference shares of £1 each. Return dated November 14th, 1932. All shares taken up. £3 10s. paid on seven ordinary shares, £507,796 10s. considered as paid on the remainder. Mortgages and charges: £756,415.

Lotus Radio, Ltd.—Satisfaction on May 16th, 1933, of mortgage or charge dated November 16th, 1931, and registered November 27th, 1931. (According to the register of mortgages, the only charge registered on November 27th, 1931, was a debenture which originally secured £20,000.)

Century Electric Co., Ltd.—Capital, £5,000 in £1 shares. Return dated December 24th, 1932. 2,387 shares taken up. £2,387 paid. Mortgages and charges, nil.

Santon, Ltd.—Capital, £4,000 in £1 shares. Return dated December 24th, 1932. All shares taken up. £2 paid, £3,998 considered as paid. Mortgages and charges at December 24th, 1932: £3,670.

Wood & Co. (Ipswich), Ltd.—Particulars filed of £300 debentures authorised May 5th, charged on the company's undertaking and property, the whole amount being now issued.

Eastern Electric Sound System, Ltd.—C. C. Murgatroyd, 23, Park Row, Leeds, ceased to act as receiver on May 18th.

Telegraph Condenser Co., Ltd.—Satisfaction in full on April 21st, 1933, of charge dated July 8th, 1930, and registered July 25th, 1930. (According to the register of mortgages, the charge registered July 25th, 1930, originally secured all moneys due to the bank.)

Sussex Electricity Supply Co., Ltd.—Satisfaction in full on April 4th, 1933, of trust deed dated July 22nd, 1921, and registered August 6th, 1921, securing £20,000 debentures (£10,000 only being issued).

Beamlites, Ltd.—Capital, £5,000 in £1 shares. Return dated November 15th, 1932 (filed March 1st, 1933). All shares taken up. £3,750 paid, £1,250 considered as paid. Mortgages and charges, nil.

Griffin Harding & Bryant, Ltd.—E. H. Hawkins, 4, Charterhouse Square, E.C.1, was appointed receiver on May 19th, under powers contained in first debenture dated November 5th, 1932.

Southport Electrical Services, Ltd.—Debenture dated May 16th, 1933, to secure £400, charged on the company's property, including uncalled capital. Holders: J. S. Ramsbottom & Co., Ltd., Bow Street, Keighley.

Viking Sales, Ltd.—Issue on February 15th, 1933, of £800 debentures, part of a series already registered.

City Notes

Siemens Bros. & Co., Ltd., held their annual meeting on May 25th, Lord Queenborough (chairman) presiding. In presenting the report and accounts (ELEC. REV., May 26th, page 761), the chairman said that the company had now been established for seventy-five years. The economic conditions which still prevailed here and abroad were not calculated to encourage telegraph administrations and companies to extend or develop facilities for overseas telegraphic communication by means of cable, and the submarine telegraph cable industry found itself working far below capacity. They secured, however, a reasonable share of the small amount of business available. With regard to submarine telephone cables, their plant was occupied with the construction of the new Anglo-Belgian cable. There was some improvement in the demand for underground telephone cables, but it was too slight to enable them to utilise their manufacturing resources to anything near their capacity. The restriction of expenditure by municipalities and electricity supply companies still curtailed the production of power and lighting mains, and the level to which the available business had fallen a year ago remained practically unchanged. Contracts were obtained from the Central Electricity Board for a h.p. cable required for the north-west area, and they supplied and erected the whole of the cable equipment for the electrical and steam plant at the Battersea power station of the London Power Co. At the close of the year, in face of severe competition, they obtained an order from the Capetown Corporation for the supply of 33,000-V cables. The grid schemes were practically completed, and comparatively little new work was being proceeded with. During the past year, however, they had been kept fairly active by extensions of the work in Egypt and in completing their contract from the Central Board in connection with the East England scheme.

The demand for telephone exchange equipments for the public service, both at home and overseas, kept most of their telephone shops fully employed. These equipments included new automatic exchange plant in the existing Whitehall exchange building, forming a record unit of 6,900 lines, as well as the extension of the Maida Vale and Ilford exchanges. Work in provincial areas included a number of new exchanges and extensions of existing ones. They had undertaken a considerable amount of work in connection with trunk demand equipment for providing a no-relay service on trunk calls. Two public exchanges in the London network and twenty-two in provincial areas had successfully been brought into service. Overseas contracts included an extension of the automatic exchanges at Hong Kong and Kowloon, Tanta and Port Said, St. John's, Winnipeg, and Trinidade (Lisbon), as well as a large trunk exchange for the Capetown area. Substantial quantities of telephone apparatus and materials had been supplied for public services both at home and overseas. The "Neophone" continued to enjoy popular favour, further con-

tracts having been received from the General Post Office and from overseas markets. In the more recent deliveries overseas they were supplying an improved type of "Neophone," in which the disturbing effects of "side tone" had been eliminated. There had also been a steady demand for rural automatic exchanges, contracts for which had been running during a large part of the year and continued to occupy their shops. Their sale, rental and maintenance business in private telephone equipments was making steady progress, and the primary battery business with Government Departments, municipalities, and railways had been well maintained. Export orders had also been secured, but competition had been most severe. Their marine wireless service had been maintained in its usual state of efficiency, but it had been affected by the adverse state of the shipping industry, as also had the output of marine signalling apparatus. The demand for mine signalling apparatus continued meagre under existing conditions of low coal output. The business transacted by overseas branches and agencies generally during 1932 showed a considerable decline from the figures for the previous year. Business with foreign countries, particularly with South America, had been greatly hampered by the uncertainty of exchange.

Siemens Electric Lamps & Supplies, Ltd., had again showed satisfactory results, although the severe industrial depression, together with the fall in prices of most of the commodities in which that company dealt, had resulted in somewhat lower profits. With a view to utilising to the fullest extent the organisation of the lamp company and thus reducing selling expenses to a minimum, they transferred to that company during the year the sale of their india-rubber wires and cables and also ebonite. The lamp company had recently invented and placed on the market a new type of neon sign. It had also taken up an exclusive licence for the manufacture of an advertising novelty called the "Dobrulux" lamp. With regard to the future, the Government was to proceed with the conversion to automatic working of the London and provincial areas as originally laid down. Orders for the North Exchange (London area) and for the whole of the exchanges in the City of Belfast telephone area were being placed with them. In other spheres of their activities, meanwhile, orders were not coming in freely; profits were falling severely, due to insufficient orders and severe price-cutting competition, and this might be reflected in future dividends.

The Shanghai Electric Construction Co., Ltd.—Presiding at the annual meeting on May 24th, Mr. J. S. Haskell (chairman) said that the early part of the year to which the accounts related was marked by a grave dislocation of business in Shanghai in consequence of hostilities between China and Japan. The effect was immediately felt by the company, inasmuch as services had to be severely curtailed or suspended, and such operation as was possible was only carried on in the face of great difficulties. Thus, while the first month of the year showed an appreciable improvement in traffics and operating profits as compared with the corresponding month of the preceding year, they had an actual loss for February, and the recovery which began to set in after the suspension of hostilities was slow and, even by the end of the year, both traffics and operating profits were at a lower level than at the close of the year before. This unavoidable state of affairs was, however, mitigated to an appreciable extent by the improvement in the silver exchange, as the result of which they had been able to convert their profits at 1s. 2¾d. to the $, as against 1s. for the preceding year, with the result that the reduction of profit expressed in sterling was only 30.35 per cent. when exchange adjustment had been allowed for. Even now, the process of recovery was not complete, and although the current year compared favourably with 1932, profits were considerably short of those for the early part of 1931, and it was evident that Shanghai was suffering from the present unprecedented commercial and financial depression. The depression had not been without effect on the Singapore Traction Co., and their half-share of its divisible profits had accordingly been reduced from £14,000 to £8,000. There was no indication yet that a general improvement had set in or was about to set in, and there were no grounds, at present, for believing that a return to the conditions of two years ago was in sight, so far as the gross receipts and net earnings of the company were concerned.

Edmundson's Electricity Corporation, Ltd., held its annual meeting on May 25th. Sir Holberry Mensforth (chairman), who presided, in presenting the report and accounts (ELEC. REV., May 19th, page 725), said that in many areas Edmundson's started supplies of electricity in provincial towns many years ago; more recently they had obtained powers over large areas which surrounded many of these older districts, and, as opportunity offered, they were consolidating their interests and liquidating many of the smaller companies which were no longer necessary. During 1931 they sold 308 million kWh, and in 1932 347 million kWh, which was an increase for a comparable period and comparable undertakings of 13 per cent. The latest figures available showed that in the quarter ended March 31st last they sold 107 million kWh, an increase of 20 per cent. as compared with the corresponding period of the preceding year, while the total connections were 557,300 kW, an increase of 18 per cent. The Corporation had grown from small beginnings up to its present stage, and the records of the past ten years had shown steady progress. They were still pioneers, for they were carrying out the largest development of rural areas in England. They would have their troubles and difficulties in this newer work, and they must appreciate the fact that these new enterprises must be given time to develop into dividend-paying undertakings. They were facing the future fortified by the belief that if they carried out their duty to the public they would be able to earn a satisfactory return on the capital invested in the undertaking. This was essential if they were to continue to have available funds for the proper development of the service. In order that no contribution of theirs should be lacking to obtain these results, they were concentrating on a real amalgamation of the companies they controlled, and they would see that in the course of this amalgamation every opportunity was taken to reduce costs where that could be done to advantage, and also to consolidate their control in order that no opportunity of expanding their output should be lost. As far as possible, they would see that all their enterprises went forward on a common policy.

Cables & Wireless, Ltd., held its annual meeting on May 24th. Mr. J. C. Denison-Pender (governor), who presided, in the course of his speech said that the fall in message receipts in 1931, in comparison with the preceding year, amounted to £485,406. In 1932 the total receipts showed a decrease of only £32,219, as compared with 1931, or appreciably less than one per cent. The decline in world trade was serious; they were not yet out of the wood and it would not be wise, in view of the difficulties that beset so many countries in different parts of the world, to forget the possibility that they might have to face developments which could not be foreseen, and might diminish their present advantage. Economies effected in 1931 were bearing their full fruit in 1932, and further economies had been carried out in the course of the year leading to a reduction in expenses of over £300,000, which brought the total reduction in two years to more than £700,000. At no stage of their efforts in this direction had they endangered the high efficiency of their service. The regenerator system was now in regular operation on the South African wireless circuit and it would be extended to other services where conditions were suitable for its adoption. In addition they were experimenting with transmission through wireless into cables, so that it might before long be possible to make fuller use of both systems, either in alternate stages, or series of stages, for handling traffic in particular directions. New radio-telephone circuits had been opened at Bermuda for telephony with ships, and in Egypt for communication with Great Britain, Germany, France and Italy. Agreements had been concluded between the Halifax and Bermuda Cable Co., and the Bermuda Telephone Co. in connection with a radio-telephone service with New York; and a wireless agreement had been concluded with the Chinese National Government. A working agreement had been made with the Direct Spanish Telegraph Co. under which considerable economies would be effected, and an agreement had been concluded regarding working in Egypt. In accordance with their policy with regard to the organisation of overseas communication facilities, they had proceeded with arrangements regarding operations in Canada and Australia. These arrangements, however, had not met with the approval of the Governments concerned.

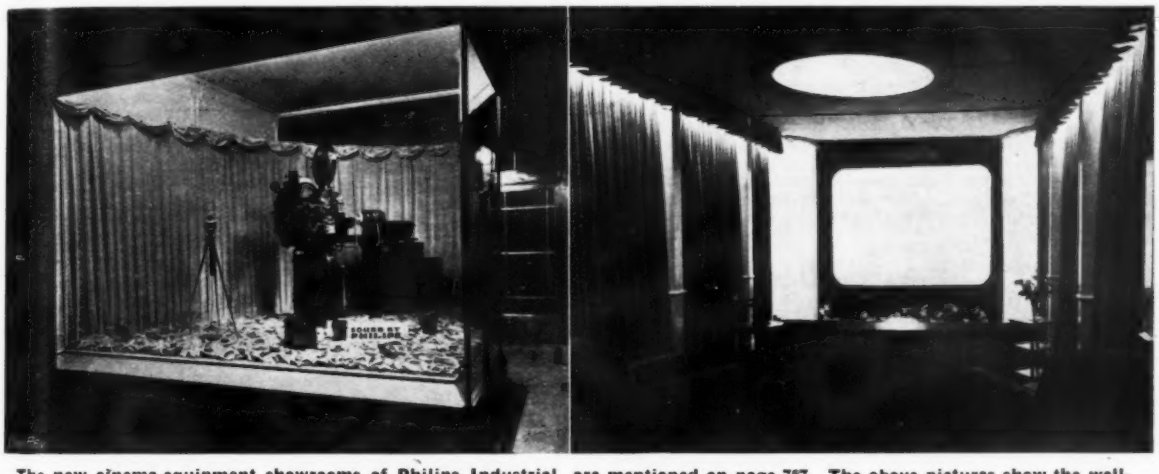
L. M. Ericsson Telephone Co.—A statement showing successful consolidation work and giving good hopes for the future activities of the company was made by the board at the shareholders' meeting held in Stockholm on May 15th. The directors have been able to reduce the credit requirements by obtaining means from various sources, by strict economy, through sales of certain assets abroad no longer needed for the work, and by restitution of working capital from a foreign subsidiary; there will, however, be no curtailment of activities. Large short-term debts and credits due in Sweden, Argentina, France, England and America, have been changed into long-term indebtedness to be repaid by annual payments and fresh credits have been granted, which, however, have been used only temporarily and partly. Agreements have been made with the International Telephone and Telegraph Co. in America defining the mutual relations between the concerns and providing for amicable and profitable co-operation. Mr. H. T. Holm has been appointed managing director of the company. The new board of directors elected at the meeting includes Mr. Marcus Wallenburg, Junr., Mr. W. Borgquist, director-in-chief of the State Waterfalls Department, president of the Board, Mr. Johansson, M. Andre Meyer, and, subject to the approval of the Government, Colonel S. Behn, of the I.T.T., New York, Mr. K. Hogstedt, and Mr. Harald Bauer.

The Chloride Electrical Storage Co., Ltd., held its annual meeting on May 29th. Mr. W. S. Naylor (chairman), who presided, in presenting the report and accounts (ELEC. REV., May 26th, p. 761) said that the buildings had been maintained in good order, and new machinery designed by their own staff had been made and installed. They were never in a more efficient condition for manufacturing batteries of all sizes, and in sufficient quantities to meet any possible demand. The same remarks applied to their branch depôts. The volume of business dealt with during the year, measured by value or tonnage, was greater than in the previous year. There was a definite expansion of their export business and given greater freedom to trade, in their world-wide organisation, they could appreciably and quickly increase their export business. The demand continued for their "Keepalite" lighting equipment, and "Exide" and "Drydex" batteries should benefit from the improvements which had been made in battery-operated wireless sets, which were being produced in increasing numbers. An innovation in motor-car starter batteries had been the production of the Exide "double-life" battery. Their "Exide-Ironclad" type of battery was proving excellent for lighting motor omnibuses, in the same way as it had established itself for the propulsion of electric vehicles and industrial trucks. The "Exide" convention was being held in June at Torquay, and several hundreds of their agents would attend.

Richard Johnson & Nephew, Ltd., held their annual meeting on May 26th, Lt.-General Sir Walter Campbell presiding. In presenting the report and accounts (ELEC. REV., May 26th, p. 761) the chairman said although the volume of trade had increased during the year the selling prices for their products had fallen. It was only by the constant examination of every detail of cost in manufacture and with the loyal co-operation of the staff and workpeople that they were able to produce the results shown. They had now practically completed their work in connection with the grid, the completed contracts including 7,758 tons of steel-cored aluminium conductor involving an output of 143,754 miles of aluminium and 43,808 miles of steel wire. They had also fulfilled a contract in India for the Punjab of approximately 2,000 tons of steel-cored aluminium. Mr. Michael Johnson visited Argentina, Brazil and Montevideo last year, and through his visit, the foundation was laid for future operations as soon as things became more normal. Mr. Johnson was now in South Africa and they proposed to continue this policy of keeping in touch with their overseas markets. They had decided on a complete reconstruction of their wire rod rolling mill.

Parkinson & Cowan, Ltd.—The accounts of this company were abstracted in our last issue (page 761) and the annual meeting was held on May 26th. Lt.-Col. H. W. Woodall (chairman and managing director), who presided, in referring to the general reorganisation and development of the company, said they had concentrated the entire secretarial and most of the clerical and costing staff of their English subsidiaries on one floor at Terminal House, Grosvenor Gardens, S.W. At the same time a new and uniform system of purchasing, costing and wages control, stocktaking, &c., had been introduced throughout all their subsidiaries at home. The scheme would afford considerable financial relief. The works were not being neglected, and in addition to the older scientific methods generally referred to as research, a form of factory development and control had come into being under the name of "production engineering," involving motion study and the development of all factory processes on scientific lines.

Compania Hispano-Americana de Electricidad ("Chade") reports a profit for 1932 of 76,764,909 gold pesetas (35,075,826 pesetas in 1931). The net profit is 35,813,585 pesetas, against 41,378,675 pesetas, and it is proposed to pay a final dividend of 6 per cent. gold, free of Spanish taxes, making 10 per cent. for the year (against 12 per cent.). As the funds in Argentina cannot be transferred, the board proposes that the amount of the final dividend shall be paid in Argentine paper pesos at the official rate of exchange (one peso=1.32 gold pesetas). This gives 22,727 Argentine paper pesos for "A," "B" and "C" shares, and 4,545 paper pesos for "D" and "E" shares. The production of electricity during 1932 was 932,160,000 kWh, as compared with 851,300,000 kWh in 1931.



The new cinema-equipment showrooms of Philips Industrial are mentioned on page 787. The above pictures show the well-arranged main window and the demonstration theatre

Guest Keen & Nettlefolds, Ltd., report a profit for the year ended March 31st last of £133,665, as compared with £201,569 in 1931-32; to this is added £458,058, making £591,723. It is proposed to pay a final dividend on the first preference shares, free of tax, but the directors are unable to recommend any other dividends. The balance carried forward is £500,723. The report states that the company is well placed to share in better conditions when they eventuate. The works of the company, and the collieries and works of its subsidiaries, have been maintained in a satisfactory condition, and are capable of a much greater rate of production than that obtaining at present. Meeting: June 8th.

The Madras Electric Supply Corporation, Ltd., reports a revenue for 1932 of £260,364, as compared with £246,305 in 1931, to which is added £11,452 brought in, making £271,816. After deducting debenture interest, &c., and allocating £40,000 to depreciation and renewals fund, there is a net profit of £77,602 (against £66,657). It is proposed to pay a final ordinary dividend of 5½ per cent., maintaining the distribution for the year at 8 per cent., and to carry forward £21,193. The capital was increased during the year by the issue of 125,000 ordinary shares of £1 at 25s. per share, and 125,000 5½ per cent., tax-free, cumulative preference shares of £1 at 22s. The sales of electricity increased from 23,984,372 kWh to 29,595,764 kWh.

The Anchor Cable Co., Ltd., reports a profit for 1932, before deducting £9,615 income tax, provided out of income tax reserve, of £41,551, as compared with £52,604 for 1931. To this is added £10,000 transferred from tax reserve account, making £51,551, and after deducting debenture interest and depreciation, and contributing £2,420 to the employés' superannuation fund, there is a balance of £44,881. It is proposed to pay a final dividend of 15 per cent., making 20 per cent. for the year, leaving £5,881, which with £185,498 brought in, makes £191,379 to be carried forward.

W. Canning & Co. propose to reduce the authorised capital from £450,000 to £375,000 by returning to holders of the issued 300,000 £1 shares 5s. per share, and by reducing the nominal amount of the 300,000 shares from £1 to 15s. A meeting to approve the proposal will be held on June 12th, and a further meeting will be held later at which resolutions will be submitted restoring the capital to its original figure by the capitalisation of part of the undivided profits.

The Colne Valley Electric Supply Co., Ltd., reports a net profit for 1932 of £33,795 (against £18,034 in 1931). It is proposed to pay a dividend of 10 per cent. (against 12 per cent.), and to carry forward £3,044.

The Northwood Electric Light & Power Co., Ltd., reports a net profit for 1932 of £14,512, which with £3,376 brought in makes £17,888. The ordinary dividend is maintained at 15 per cent. and £3,604 is carried forward. The connected load increased from 8,460 to 10,056 kW.

The Electrical Finance & Securities Co. reports a net profit for 1932 of £30,813, as against £24,260 in 1931. The final ordinary dividend is 5 per cent., plus a bonus of 2½ per cent., making a total distribution of 12½ per cent. for the year (same), leaving £13,740 to be carried forward.

The Sphere Investment Trust, Ltd., reports a net revenue of £32,236 for the year ended March 31st last (against £37,412 for 1931-32). The ordinary dividend is 2 per cent. (against 3 per cent.), and £9,895 is carried forward.

Callender's Cable & Construction Co., Ltd., has announced a final dividend of 10 per cent., less tax at 4s. 9d., making 15 per cent. for the year on the ordinary shares (same).

The Wellman Smith Owen Engineering Corporation, Ltd., reports a net loss for 1932 of £5,355, which with a loss brought in, makes a debit of £5,871 to be carried forward.

Crompton Parkinson, Ltd., has declared an interim dividend at the rate of 6 per cent. on the ordinary and "A" ordinary shares (against 10 per cent.).

The British Columbia Power Corporation has declared a quarterly dividend of 50 cents per share on the class "A" shares (same).

The Brentwood District Electric Co. reports a net profit for 1932 of £6,810, as compared with £6,239 in 1931. The ordinary dividend is maintained at 8 per cent., the reserve receives £1,500, and £1,343 is carried forward, subject to directors' remuneration.

Mirrlees, Bickerton & Day, Ltd., propose to pay an ordinary dividend of 3 per cent. for the year (against 2½ per cent.).

The Brazilian Traction, Light & Power Co. has announced a quarterly dividend of 1½ per cent. on the preference shares.

Stocks and Shares

TUESDAY EVENING.

STOCK Exchange markets are very active. At this time of year, with the Whitsun holidays close at hand, the tendency is for business to dwindle, and for public interest to shrink so far as stocks and shares are concerned. The present year has proved exceptional in many financial respects, and in spite of the traditional quietude of pre-Whitsun, the markets are now in a state of considerable animation. For this, two main reasons are responsible: the first, that the United States has definitely departed from the gold standard, which implies, of course, that commodity prices will continue to advance; the second being the decision of the British Government to stop for the time being any further issue of the Two-and-a-half per cent. Conversion bonds, whose weekly outpouring has contributed of late to the mild depression caused in gilt-edged stocks by the eagerness of investment to exchange from these into stocks and shares of more speculative order. The effect of the latter announcement was to bring about a violent upward reaction in the prices of gilt-edged securities, while the American decision led to a further scramble for shares in companies that deal with commodities and with metals.

Home Railway Stocks

Underground Electric Railway shares hold their recent rise to 21s. 6d. on the cut in the price of petrol, and District ordinary has hardened to 68¾. Whether the "cut" will continue in force for long is deemed a little doubtful in view of the restriction upon oil output in the U.S.A., a policy to which President Roosevelt has given energetic support. Metropolitan consolidated is 2 points lower at 70. Speculative investment had taken the stock in hand on the idea that it will look cheap when compared with the new London Passenger Transport issues, upon the latter becoming marketable. The turning of public attention to ordinary stocks and shares tends to rob gilt-edged securities of their previous attraction, and, accordingly, there has been mild selling of the Metropolitan consolidated. British Electric Traction deferred has been advanced by 25 points, to 300.

Gilt-edged Securities

Central Electricity 4½ per cent. debenture has gone back to 107, though the similar interest stock of the London and Home Counties Authority remains at 109. There has been a little cessation of buying in the markets for all safety-first issues. It is not quite so easy now as it was a few weeks ago to place unimpeachable stocks unless some kind of temptation is offered in the prices. Nevertheless, the feeling is strong that the present-day scramble for industrial ordinary stocks and shares may be carried too far, and that it will not be long before investors will be turning back to look for gilt-edged securities, which, after all, afford the absolute safety that is essential to a very large amount of money in the hands of the public.

Electricity Supply

County of London ordinary are 6d. lower at 53s. 3d. Metropolitans at 50s. 9d. are easier to the same extent. In both these cases the yield on the money is still a little under 4 per cent., and the declines, trifling as they are, indicate the trend of investment at the moment. The ordinary shares of the London lighting companies afford returns, it will be noticed by reference to our lists, of approximately £4 3s. 6d. per cent., and as it is extremely difficult to obtain ordinary shares that offer the safety which these London electricity supply shares provide, the maintenance of prices in this section is likely to continue. A line of Lancashire Electric ordinary shares came to market the other day at 31s. 3d. Of the same company's 6 per cent. tax free preference there are shares available in the neighbourhood of 34s., possibly a little lower, and 2,000 of the company's 7 per cent. participating preference can be bought at 34s. These last-named pay, at this price, £4 2s. 3d. per cent. on the money. They rank equally with the ordinary shares up to a further 3 per cent. per annum, after the latter have received 7 per cent. The ordinary dividend for 1930 was 6½ per cent., and for the two following years, 1931 and 1932, it was raised to 7 per cent.

Shares on Offer

Of the new Llanelly & District 6 per cent. preference there are 1,000 available at 25s. 6d., these yielding £4 14s. per cent. on the money. A partial dividend is due on August 1st, after which the full 3 per cent. becomes payable each half-year. The Isle of Thanet has a participating preference share entitled to 6 per cent. After the ordinary shares have received 6 per cent., the participating preference rank equally. The company has paid a dividend of 4 per cent. on its ordinary shares for each of the past six years. British Power & Light Corporation 6 per cent. preference can be bought at 26s., with April and October dividends, to yield £4 12s. per cent. on the money, and there are 2,500 Associated Electrical Industries 8 per cent. preference on offer at 30s., giving £5 6s. 6d. per cent., with a dividend due on the 1st of July.

West Gloucestershire ordinary stock strengthened to 65. Atlas shares have gained 9d. at 9s. 6d. British Power & Light are quiet at 17s. 4½d. In the Indian list, Calcutta Electrics have moved up to 48s. Amongst foreign bonds, Tokyo Electric sixes at 82½ are 2½ to the good.

Cables and Wireless Drop

Disappointment with the speech of the chairman at the Cables & Wireless meeting last week resulted in a fall of 7½ points in the preference stock. The Governor frankly stated that no dividend on this stock will be paid next September, a very unpleasant announcement to those who had been previously confident that the stock would get a full dividend this year. The present price is 75½, and, in sympathy, the "A" ordinary has gone back to 25, the "B" to 10, showing falls of 4 and 1½ respectively. Globe ordinary dropped 15s., to 10½, and the preference 5s., to 11½.

Anglo-American Telegraphs are rather better, the preferred improving to 105½. American Telephone & Telegraph at 150½ is 8 higher. International Telephone & Telegraph rose to 17½. These advances are in step with the buoyancy exhibited by American utilities of all descriptions, due to an outburst of bullishness in Wall Street following upon the definite departure of the United States from the gold standard. Marconi Marines rose half a crown to 32s.

Manufacturing and Equipment Shares

Movements in the market for shares in manufacturing companies are somewhat contradictory. Henleys are a good spot at 6½. General Electrics rose to 43s. 3d. On the other hand, Siemens ordinary have gone back 2s. 3d. to 24s. 6d., in further reflection of the decrease in the dividend. Callender's have declared the usual dividend, making 15 per cent. for the year, and the price of the shares remains unchanged at 2½. British Insulated are steady at 67s. 6d., and Associated Electrical Industries are also firm at 17s. 6d. The rise in the prices of commodities has had a favourable effect upon rubber shares, the market in which has suddenly regained an animation to which it has long been a stranger. Prices have shot up considerably. The iron and steel group is also better, and Babcock & Wilcox at 35s. are ⅞ up. In the anxiety to buy American shares, Electrical & Musical Industries have been in demand, the price of the ordinary showing strength at 13s. 9d.

Crompton Parkinson shares are flat on the cut in the interim dividend. The ordinary dropped to 17s. 6d., the 8 per cent. preference to 23s. 9d., and the sixes to 20s., the last-named showing a fall of 4s. 6d.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1931.	1932.	Price, May 30.	Rise or Fall.	Yield. p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	73/9	—⅛	4 1 4
Brompton Ordinary	1	8½	7	32/6	—	4 6 2
Central Electricity 4½% Deb. ..	Stock	4½	4½	107	—1	4 4 1
Charing Cross Ordinary	1	8d	7	33/6	—	4 3 7
Chelsea	1	8½	7	32/6	—	4 6 2
City of London	1	10	10	33/6	—	4 3 7
Clyde Valley	1	7	7	35/-	—	4 0 0
County of London	1	10½	10½	53/3	—6d.	3 10 2
Edmundsons' 7% Pref.	1	7	7	30/6	—	4 11 10
Elec. Dis. Yorkshire	1	9	9	45/9	—	3 18 7
Elec. Supply Corporation	1	11	11	65/9	—	3 7 0
Kensington Ordinary	1	8	7	33/-	—	4 4 10
Lancs Light and Power	1	7	7	32/6	—	4 6 2
London & Home Counties 4½% Deb.	Stock	4½	4½	109	—	4 3 4
London Electric	1	9	7	32/6	—	4 6 2
Metropolitan	1	10	10	50/9	—6d.	3 18 9
Midland Counties	1	7	7	35/-	—	4 0 0
Mid. Elec. Power	1	8	8	38/9	—	4 2 6
North Eastern Electric Ordinary...	1	6	6	30/-	—	4 0 0
Do. 7% Pref.	1	7	7	32/6	—	4 6 2
Northampton	1	10	10	50/-	—⅛	4 0 0
Notting Hill 6% Pref.	10	6	6	13½	—	4 10 7
North Met. Elec. 6% Pref. ...	1	6	6	29/6	—	4 1 4
St. James' and Pall Mall	1	8	7	32/6	—	4 6 2
Scottish Power	1	8	8	36/3	—	4 8 2
South London	1	8½	7	33/-	—	4 4 10
Urban Ordinary	1	7	7	37/6	—	3 14 8
Westminster Ordinary	1	8½	7	32/6	—	4 6 2
Whitehall Elec. Invst. 7½% Pref....	1	7½	7½	17/6	—	8 11 2
Yorkshire Elec.	1	8	8	43/3	—	3 14 3
HOME RAILS.						
Central London Ord. Assented ...	Stock	4	4	87½	—	4 11 5
Metropolitan	„	2½	1½	70	—2	2 6 5
Do. District	„	4½	3	68½	+1	4 7 7
Underground Electric	1	7	4½	21/6	+	4 3 9
TELEGRAPH AND TELEPHONES.		1930.	1931.			
American Tel. & Tel.	$100	9	9	150½	+8	5 19 7
Anglo-Am. Tel. Pref.	Stock	6	6	105½	+1	5 13 10
Do. Def.	„	1½	1½	23½	—	6 7 8
Cables & Wireless 5½% Pref. ...	„	5½	2½	75½	—7½	3 12 10
Do. A 7½% Ord.	„	—	Nil	25	—4	—
Do. B Ord.	„	—	Nil	10	—1½	—
Globe Tel. and T. Ord.	10	8½	Nil	10½	—½	2 7 7
Do. do. Pref.	10	6	6	11½	—½	5 2 2
Great Northern Tel.	10	20	20	29	—	6 18 0
Marconi-Marine	1	15	10	32/-	+½	4 13 9
Oriental Telephone Ord.	1	12	12	2½	—⅛	*4 1 8
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref. ...	5	—	—	5/-	+¼	—
Do. do. 2nd Pref.	5	—	—	1/9	—	—
Do. do. 5% Deb.	Stock	—	—	10	+2½	—
British Electric Traction Def. Ord.	„	5	5	300	+25	—
Do. do. Pref. Ord. ... „	„	8	8	134	—	5 19 5
Brazil Traction	100	—	—	14¾	+¾	—
Brit. Columbia Elec. Rly. Pce. ...	Stock	5	5	102½	—	4 19 6
London & Sub. Trac. 5% Pref. ...	1	Nil	Nil	17/6	—	—
London United Tram Deb. ...	Stock	4	4	75½	—	5 6 0
Mexico Trams. 5% Bonds ...	—	5	5	36½	+9	13 14 0
Mexican Light Common	100	Nil	Nil	12½	+1	—
Do. 7% Pref.	100	7	7	15	—	—
Do. 1st Bonds	—	5	5	64½	—	7 15 0
Victoria Falls Ord.	1	15	15	85/-	+6d.	3 10 7
Yorkshire (West Riding)	1	Nil	Nil	8/-	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	6	4	17/6	—	4 11 5
Do. Pref.	1	8	8	28/3	—	5 13 3
Babcock & Wilcox	1	14	14	35/-	+⅞	5 2 10
British Aluminium Ord.	1	10	5	27/6	+6	3 14 1
British Insulated Ord.	1	15	15	67/6	—	4 9 3
Brush Ord.	Stock	5	Nil	40	—	—
Callender's	1	15	15	2½	—	5 4 2
Do. 6½% Pref.	1	6½	6½	28/9	—	4 10 5
Crompton Parkinson Ord. ...	5/-	30	24	17/6	—2/6	—
Do. 8% Pref.	1	8	8	23/9	—8/3	6 11 9
Edison-Swan 1st Pref.	1	7½	7½	24/6	—	6 2 5
Do. 5% Deb.	Stock	5	5	102½	—	4 17 7
Electric Construction	1	Nil	Nil	10/-	—⅛	—
Enfield Cable Ord.	1	25	25	4½	—	5 11 1
English Electric	1	Nil	Nil	7/6	—	—
Do. do. Pref.	1	Nil	Nil	12/6	—	—
Ever Ready	5/-	35	35	29/-	—	6 0 8
Ferranti Pref.	1	7	7	24/3	+3d.	5 15 6
G.E.C. Pref.	1	6½	6½	29/9	—	4 7 5
Do. Ord.	1	10	8	43/3	+9d.	3 14 3
Henley's	1	30	30	6½	+½	4 18 0
Do. 4½% Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	2/6	—	—
Johnson & Phillips	1	10	5	18/3	—	5 9 7
Siemens Ord.	1	7½	7½	24/6	—1/3	5 6 0
Telegraph Construction	£1	Nil	Nil	18/3	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1931

24275. "Means for regulating the energy flow between two alternating current sources connected through a frequency convertor set." British Thomson-Houston Co., Ltd. August 28th, 1930. (391843.)

24461. "Electric clocks." Ferranti, Ltd., and W. Holmes. August 31st, 1931. (391814.)

27407. "Electric receiving or amplifying devices." Radioakt.-Ges. D. S. Loewe, and P. Kapteyn. October 3rd, 1930. (391770.)

28404. "Switch devices for overhead electric transmission lines." Electric Transmission, Ltd., and W. J. John. October 13th, 1931. (391771.)

29374. "Current rectifiers." Soc. Anon. Hewittic and M. E. Demontvignier. November 5th, 1930. (391792.)

29673. "Protective devices for alternating current dynamo-electric machine." International General Electric Co., Inc. October 25th, 1930. (391793.)

30321. "Television in natural colours." T. T. Baker. November 2nd, 1931. (391781.)

30441. "Electrical delay actions or circuits depending upon the operation of light-sensitive devices." H. W. Pook and Radiovisor Parent, Ltd. November 3rd, 1931. (391797.)

30466. "Automatic starters for slip-ring induction motors." British Thomson-Houston Co., Ltd., H. C. Hastings, and S. N. Bourne. August 3rd, 1932. (391871.)

30472. "Mercury and other conducting liquid electric switches or distributors." J. Part and B. B. Carter. November 3rd, 1931. (391850.)

30509. "Electrical signalling systems." Automatic Electric Co., Ltd., T. R. Rayner, and G. A. Burns. November 3rd, 1931. (391852.)

30626. "Machine for capping the electrodes of dry batteries." A. H. Stevens (Autom Spezial-Maschinen Ges.). November 4th, 1931. (391820.)

30656. "Telephonic repeater systems." Electrical Research Products Inc. December 10th, 1930. (391827.)

30668. "Electric circuit-breaker tanks or like casings subjected to heavy internal pressure." A. Reyrolle & Co., Ltd., A. Allan, and B. H. Leeson. November 5th, 1931. (391829.)

30728. "Telephone systems." J. E. Pollak (Siemens & Halske Akt.-Ges.). November 5th, 1931. (391836.)

30764. "Telegraph printing and like selective apparatus." Creed & Co., Ltd. (Teletype Corporation). November 6th, 1931. (391855.)

30765. "Automatic or semi-automatic telephone exchange systems." Standard Telephones & Cables, Ltd. November 21st, 1931. (391856.)

30766. "Automatic or semi-automatic telephone systems." Standard Telephones & Cables, Ltd. December 19th, 1930. (391857.)

30834. "Telephone systems." Automatic Electric Co., Ltd., F. T. Belas, and G. T. Baker. November 6th, 1931. (391861.)

30912. "Metal-clad electric switchgear." A. Reyrolle & Co., Ltd., J. Christie, and A. Donkin." November 7th, 1931. (391864.)

32151. "Fluorescent screens, such, for example, as are used with cathode-ray tubes." Electrical & Musical Industries, Ltd. (R.C.A. Victor Co. Inc.). November 19th, 1931. (391887.)

32333. "Commutators for dynamo-electric machines." British Thomson-Houston Co., Ltd., L. Griffiths, C. J. Morton, and S. H. Franklin. November 21st, 1931. (391888.)

32659. "Electric trolley bus brakes." J. G. Smithson. November 25th, 1931. (391890.)

33263. "Electrical heating elements and the manufacture of the same." J. L. Musgrave, R. Grierson, and R. Crittall & Co., Ltd. December 1st, 1931. (391895.)

34380. "Combined switches and plug-and-socket connectors." General Electric Co., Ltd., and W. Manchester. December 11th, 1931. (391900.)

35114. "Electric couplings." W. J. Davy. December 18th, 1931. (391904.)

35263. "Television reception device." Dr. S. Loewe and M. Von Ardenne. December 22nd, 1930. (391905.)

35446. "Telephone cables." Siemens Bros. & Co., Ltd., and A. Rosen. December 22nd, 1931. (391906.

35591. "Routine-testing equipment for telephone or like systems." Automatic Electric Co., Ltd., and P. B. Tancred. December 23rd, 1931. (391907.)

1932

150. "Road-traffic signals." Chance Bros. & Co., Ltd., J. H. Abbink-Spaink, and L. B. H. Hallett. January 2nd, 1932. (391910.)

3023. "Alternating-current electric motors." J. W. Mulligan and Associated Electrical Industries, Ltd. February 1st, 1932. (391922.)

3725. "Dynamo-electric generators." British Thomson-Houston Co., Ltd. February 7th, 1931. (391930.)

3866. "Electric motor control systems." British Thomson-Houston Co., Ltd., and A. A. Pollock. February 9th, 1932. (391932.)

5147. "Electric switch for alarm clocks." H. Fritzsch. February 11th, 1931. (391934.)

4749. "Thermionic valves or electron discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 24th, 1931. (391938.)

5882. "Grid type resistors for use with electric furnaces." Birmingham Electric Furnaces, Ltd. (Electric Furnace Co.). February 27th, 1932. (391948.)

8091. "Electric water heaters." Electric Fires, Ltd., and C. H. Smith. March 18th, 1932. (391959.

11833. "Luminous electric discharge tubes." General Electric Co., Ltd. May 13th, 1931. (391971.)

12894. "Electro-magnetically operable apparatus for recording periods of operation." H. A. Cope (Fabriques des Montres Zenith). May 4th, 1932. (391976.)

13853. "Thermionic and like valve circuits." Marconi's Wireless Telegraph Co., Ltd. (Radio Corporation of America). May 13th, 1932. (391979.)

15142. "Multiple brush selectors for automatic telephone installations." F. Merk and Fulk & Co., Telephon-und Telegraphenwerke Akt.-Ges. June 2nd, 1931. (391989.)

16109. "Electric arc horns." G. R. Shepherd (Westinghouse Electric Manufacturing Co.). June 7th, 1932. (391998.)

16805. "Electric clocks." Stockall Marples & Co., Ltd., and J. J. Stockall. June 14th, 1932. (Addition to 384128.) (391999.)

16823. "Electric couplings." W. N. Matthews Corporation. June 22nd, 1931. (392000.)

23641. "Fixing device for electrical switch covers and the like." A. Watson and H. A. Wootton. August 24th, 1932. (392033.)

23829. "Synchronous motor clocks." British Thomson-Houston Co., Ltd. (Allgemeine Elektricitäts Ges.). August 25th, 1932. (392035.)

24433. "Device for the protection of arc rectifiers." Siemens-Schuckertwerke Akt.-Ges. September 19th, 1931. (392037.)

25155. "Electric plug-and-socket couplings." F. Schmidt. September 9th, 1931. (392040.)

25666. "Transmission systems for ultra-short waves." International Communications Laboratories Inc, and A. G. Clavier. September 15th, 1932. (392043.)

26036. "Liquid electric power switches and the like." Siemens-Schuckertwerke Akt.-Ges. November 28th, 1931. (392051.)

26037. "Firedamp-proof plug devices and the like." Siemens-Schuckertwerke Akt-Ges. December 21st, 1931. (392052.)

28590. "Control apparatus for electric elevators." Igranic Electric Co., Ltd., and R. B. Hunter. October 13th, 1932. (Addition to 380444.) (392066.)

28738. "Method of securing flexible conductor to a rigid conducting member, such as a carbon bush or the like." Compagnie Lorraine de Charbons pour l'Electricité. November 14th, 1931. (392067.)

29253. "Electrical instruments." British Thomson-Houston Co., Ltd. October 19th, 1931. (392072.)

30304. "Multiple position, rotary or oscillatory electric switches." English Electric Co., Ltd., and A. A. Heath. October 28th, 1932. (392078.)

30318. "Automatic telephone stations." Telephon-Apparat-Fabrik E. Swietusch & Co., Ges. December 5th, 1931. (392079.)

31047. "Welding-apparatus." British Thomson-Houston Co., Ltd. (General Electric Co.). November 3rd, 1932. (392087.)

32857. "Permanent magnets." L. Mellersh-Jackson (Deutsche Edelstahlwerke Akt.-Ges.). November 21st, 1932. (392096.)

33432. "Automatic-starting rheostats for electric motors." B. R. Planche. March 11th, 1932. (Cognate application 33433/32.) (392100.)

33669. "Electric indicating instruments and switches." British Thomson-Houston Co., Ltd. November 30th, 1931. (392101.)

35343. "Electric circuits tuned to offer low impedance to currents of a plurality of frequencies." British Thomson-Houston Co., Ltd. December 18th, 1931. (392113.)

1933

145. "Controlling-means for mercury-vapour valves." Akt.-Ges. Brown, Boveri et Cie. January 25th, 1932. (392125.)

386. "Caps for electric incandescent lamps." O. Recher. January 12th, 1932. (392126.)

7571. "Oscillatory electric switches." English Electric Co., Ltd., and A. A. Heath. October 28th, 1932. (Divided application on 30304/32.) (392135.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from May 24th:—

Air-Way (lettering and design). No. 540052. Class 6. Vacuum cleaning machines, electric cleaning machines, and parts thereof, &c.—Air-Way Electric Appliance Corporation, Toledo, O., U.S.A (British representatives: D. Young & Co., 11-12, Southampton Buildings, Chancery Lane, W.C.2.)

Bemco. No. 532541. Class 8. Electric cables, flexibles, fitted electrical switchboards, morse keys (being telegraphic instruments), and electric batteries (not for medical purposes).—British Electrical & Manufacturing Co., Ltd., 7-13, Clavering Place, Newcastle-on-Tyne.

Blue Triangle. No. 537334. Class 8. Radio and television transmitting and receiving sets, thermionic valves, loud speakers, telephones, electric dry cells and accumulators (not for medical purposes), radio receiving apparatus, &c.—British Blue Spot Co., Ltd., 94-96, Rosoman Street, E.C.1.

Lynx. No. 533895. Class 8. Loud speakers.—Ultra Electric, Ltd., Erskine Road, N.W.3.

Autoscope. No. 539413. Class 8. Television apparatus combined with radio gramophones.—Dulcetto Polyphon, Ltd., 2-3, Newman Street, W.1.

Binode. No. 539828. Class 8. Thermionic valves.—Mullard Radio Valve Co., Ltd., Nightingale Lane, Balham, S.W.12.

Parafeed. No. 540438. Class 8. Electric transformers for use in connection with radio-telephonic receiving sets.—Radio Instruments, Ltd., Purley Way, Croydon.

Elsico. No. 537596. Class 13. Low power electric lamps (ordinary) for attachment to electric light switches for the purpose of indicating their situation in the dark.—S. V. Offord, trading as S. Offenbacher & Co., 81, Milton Street, E.C.2.

Neron-Linestra. No. 539239. Class 13. Electric lamps (ordinary) and parts thereof.—Osram Gesellschaft, Berlin. (British representatives: Cruikshank & Fairweather, 65, Chancery Lane, W.C.2.)

Lasilac. No. 536785. Class 50. Compositions mouldable under heat and pressure made from condensation products of phenol and formaldehyde, synthetic resins, casein, or fibre pulp, and articles made from such compositions or from bitumen.—Joseph Lucas, Ltd., Great King Street, Birmingham.

Dormilux. No. 539727. Class 50. Lamp shades made of cellulose derivatives.—Edison Swan Electric Co., Ltd., 123-125, Queen Victoria Street, E.C.4.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Laundry and dairy premises for the North of Scotland College of Agriculture, 41½, Union Street (electrical installation); Tawse & Allen, architects, 10, Bon Accord Square.

Aberystwyth.—Extensions, County School (£5,500); J. Lewis Evans, architect.

Armadale (WEST LOTHIAN).—Houses (204); W. Chambers & Sons, Ltd., contractors, Motherwell.

Ashton-under-Lyne.—Bakery, Deane Road, for R. Wilson, Ltd. (electrical installation); J. H. Catlow & Son, Ltd., builders, Hulton Street, Denton.

Aylesbury.—Houses (46); R.D.C. surveyor. Postal sorting office for H.M. Office of Works, King Charles Street, S.W.1.

Barking.—Factory, River Road; Messrs. Orrock. Improvements to baths, concert hall and branch libraries; borough engineer.

Barnsley.—Junior school, Brampton, for the trustees of the Educational Foundation of George Ellis (electrical installation); C. D. Potter & Sons, Ltd., builders, 119, Doncaster Road.

Bath.—Extensions, Statutory Hospital (£14,750); city engineer. Cinema (£60,000); Jacob Long & Sons, builders.

Bexhill-on-Sea.—Extensions, Clinch Green Hospital; borough surveyor.

Birmingham.—Maisonettes (304), Sycamore Estate (£84,500); clinic, Lancaster Street (£13,880); welfare centres, Marsh Lane (£5,664) and Monument Road (£3,200); and reconstruction of works, Dudley Road Hospital (£6,000); city engineer. Development of Redhall Farm Estate, Quinton; J. White, Jr.

Blyth.—Houses (200), South Farm Estate (£46,775); borough engineer.

Bognor Regis.—Bus station for Southdown Motor Services, Ltd.

Bournemouth.—Extensions, Stourfield schools (£11,000); F. W. Ibbett, director of education.

Braintree.—Bakery, Bocking End, for the Co-operative Society; secretary.

Brentwood.—Hospital (£36,000); K. C. F. Foster, builder.

Brighton.—Houses (24), Carden Avenue Estate, and flats, Widdicombe Way; Braybons, Ltd. Flats (33), Crescent Park Road; T. J. Braybon.

Cheriton (FOLKESTONE).—Houses (22); U.D.C. surveyor.

Chester.—Reconstruction, City Road Methodist Church (heating and electrical work, £7,000); E. Pritchard, builder Canal Street.

Chorley.—Bathing pool, Hartwood Hall; W. Draper. Development, Astley Estate; Capt. T. A. Tatton.

Congleton.—Houses (50), Rood Hill; borough surveyor.

Connah's Quay.—Church, Queen's Ferry, for Rev. J. J. Robinson; R. T. Beckett, architect, 2, Temple Row, Wrexham.

Cowley.—Four shops, Hollow Way; J. E. Cammell.

Dagenham (ESSEX).—Factory, High Road, for May & Baker, Ltd., Garden Wharf, London, S.W.

Derby.—Cinema, Ormaston Road, for the Provincial Cinematograph Theatres, Ltd.; W. E. Trent, staff architect.

Durham.—Houses (50), Sherburn Road; J. W. Green, city surveyor.

Edinburgh.—Cinema (£13,000), Georgie Road; J. McKissack & Son, architects, 63, West Regent Street, Glasgow. Conversion of David Kilpatrick School into technical and commercial school (£6,500); director of education.

Elland (YORKS).—Houses (50); U.D.C. surveyor.

Ely.—Cinema, Newnham Street; Cinema Co.

Enfield.—Houses (40), Cheyne Walk; G. W. Newman. Houses (170), Greenwood Avenue; Homemakers, Ltd. Houses (34), Parsonage Gardens; G. Reed & Sons, Ltd. Flats, Goldsdown Road; U.D.C. surveyor.

Enfield Wash.—Houses (240), Orchard Estate; Hilbery Chaplin, Ltd.

Epsom.—Houses (36), Stoneleigh Park Estate, for E. F. Milborne. Houses (20), for Bridgewater Bros. Houses (22), for Heath, Revell & Co.

Essex.—High school for girls, Romford; J. Stuart, county architect, Chelmsford.

Exeter.—Houses (300), St. Loyes Estate; city engineer.

Fenton (STAFFS).—Houses (50), Whieldon Road; Bates & Hughes.

Friern Barnet.—Branch library (£3,532); A. Fairhead & Sons, Ltd., Enfield.

Glasgow.—Houses, Maryhill Road and Shawpark Street; architect, Housing Department. Houses (168), South Chester Street, housing director. School, Bardowie Street, for E.C. Reconstruction of premises, Bath Street; Thompson Sandilands & Macleod, architects, 248, West George Street.

Glossop.—Extensions, West End School; borough engineer.

Gorton.—Alterations to Olympia Picture House, Hyde Road (electrical installations); Drury & Gomersall, architects, Imperial Buildings, Oxford Road, Manchester.

Greenock.—Boxing hall (1,000 seats); Wm. Gallacher, commission agent, 13, Lauriston Street.

Hanwell.—Estate development, Uxbridge Road; Vigers & Co.

Huddersfield.—Additions to factory, Manor Mills, King's Mill Lane, for Cuthbert & Hobson, Ltd. (electrical installation); J. T. & H. Bottomley, builders, Hollow Bank Road, Lindley.

Ilford.—Houses (245), Dawlish Drive, &c.; Ilford Building Co. Houses (28), Stapleford Avenue; J. W. Lohden. Isolation hospital extensions (£51,000); borough engineer.

Irish Free State.—(BOYLE, Co. ROSCOMMON).—Houses (24), Tangier Estate; McDonald, Dixon & Downs, architects, 20, Ely Place, Dublin. (MUINEBHEAG, Co. CARLOW).—Houses (60); F. Gibney, architect, 16, Westmoreland Street, Dublin, C.4. (YOUGHAL, Co. CORK).—Houses (20); H. T. Spreadborough, town surveyor.

Keighley.—Houses (12), Exley Drive; Hird Bros. & Co., Ltd. Houses and shops, Highfield Lane; J. W. Midgley.

Kilmarnock.—Houses (104), with electrical work, Bellevue; J. Hay & Steel, architects, West George Street.

Leeds.—Houses (170), Torre & Potternewton Estates; city architect.

Leith.—Offices and showrooms, for Bellwatt Motors; J. M. Johnston, architect, 47, Charlotte Street.

Liverpool.—Offices, Dale Street, for the Blackburn Philanthropic Assurance Co., Ltd.; Geo. Platt & Sons, contractors, Stanley Road, Bootle.

London.—(EDMONTON).—Eight shops and flats, Silver Street; C. L. Fox. (FINCHLEY).—Factory, High Road; W. Luck & Sons. (HENDON).—Estate development, near Headstone Lane Railway station; A. Flint. (MAYFAIR).—Block of flats, Curzon Hotel and Restaurant site; H. Tanner, architect, 3, Hanover Square, W.1. (POPLAR).—Alterations to baths (£6,749); borough engineer. Additions, St. Katherine's College, Brunswick Road; Mason's (Poplar), Ltd. (ST. JOHN'S WOOD).—Block of flats, Grove End Road and Abbey Road; J. A. Mactaggart. (ST. MARYLEBONE).—Rehousing, Wilcove Place; Marylebone Housing Association. Rebuilding, 34, Hamilton Terrace; Guy Dauber, architect. Buildings, 505-540, Oxford Street; Sir Burnet Tait & Lorne.

Longton (STAFFS).—Houses (35), Gom Mill Road (£11,438); W. J. Simms, Sons & Cooke, Ltd., Nottingham.

Manchester.—Additions to Chorlton Park Municipal Schools (electrical installation); E. E. Coleman, Ltd., builders, Washway Road. Shops, Royal Oak and Hollyedge Estates; A. Tomkins, Salford.

Milnsbridge (YORKS).—Omnibus garage; Lunn & Kaye, architects.

Morecambe.—Houses (62), Tranmere Park Estate; F. & H. Obank.

Northfleet.—Houses (30), Colyer Road; R. Hopkins & Sons.

Norton (YORKS).—Houses (24); U.D.C. surveyor.

Oxford.—Houses (135), Cutteslowe Estate; city engineer. Houses, Westbury Crescent (78) and Cowley Road (132); N. Moss & Son, Ltd. Factory, Carsington Road; British Paint & Lacquer Co., Ltd.

Patcham (SUSSEX).—Houses (65), Ladies Mile Estate; G. Ferguson & Son.

Perth.—Houses (200); burgh surveyor. Cinema, tearooms, &c. (£30,000); R. Wotherspoon, solicitor, Inverness.

Peterborough.—Offices, for the Provincial Building Society (£2,798); J. W. Barber, builder, Priestgate.

Petersfield (HANTS).—Public hall (£5,000); Dr. H. Roberts, secretary, Oakshott Hanger, Hawkley.

Ponders End.—Extensions, London Plywood Factory; Dunsmore Bros.

Pontefract.—Extensions, Eagle Works, for Ewbanks, Ltd.; Pennington, Hustler & Taylor, architects.

Repton (DERBYSHIRE).—Houses (34); R. S. Litherland, R.D.C. architect, 10, High Street, Burton-on-Trent.

Rugby.—Extensions, Harborough Magna Hospital, for the Joint Hospital Board (£3,000); W. H. Adams & Sons, Ltd., builders, 35a, Regent Street.

Sale.—"The Pyramids" Cinema, Cross Street, for J. E. Buckley (£40,000); J. E. Armstrong & Co., Ltd., builders, Broughton, Manchester.

Sedgefield (DURHAM).—Houses (100); J. Stones, R.D.C. surveyor.

Skellingthorpe (LINCS).—Houses (40), for Scott & Turnbull, builders, Kingsley Street, Leicester.

Spennymoor (DURHAM).—Slum clearance scheme; U.D.C. surveyor.

Stirling.—R.C. church, Cowie (£3,000); priest in charge.

Stroud (GLOS).—Houses (50), Uplands; U.D.C. surveyor.

Swadlincote (NEAR DERBY).—Reconstruction of Empire Cinema; L. Swanwick, architect, 3, High Street.

Tilbury.—Methodist church extensions (£2,000); C. M. Shiner, architect, Grays.

Twickenham.—Houses (126); Enticknap Bros., builders, Wormley, Godalming.

Tynemouth.—Houses (216); J. L. Beckett, borough engineer, North Shields.

Walsall.—Extensions, General Hospital, Bradford Street; Jeffries & Shipley, architects, Kings Court, Bridge Street.

Warrington.—Elementary school, Bewsey area (electrical installation); Wright & Hamlyn, architects, 20, Winmarleigh Street.

Washington (DURHAM).—Houses (56); R. J. Swaddle, U.D.C. surveyor.

Wealdstone.—Shops and flats, Kenton Road; Central Estates. Alterations and additions, 74-88, Carmelite Road; Lambert & Cooke.

Wembley.—Estate development, Harrow Road; A. J. Butcher.

West Riding.—Junior and infants' school, Thurnscoe, for C.C. (electrical installation); E. Brown & Son, builders, 37, Barnsley Road, Wath-on-Dearne.

Whickham-on-Tyne.—Houses (22), for Priestman Collieries, Ltd.

Whitley Bay.—Houses (32), for Temple & Pyle, builders, Whitley Road.

Wigan.—Schools for St. Joseph's, Caroline Street (electrical installation); W. C. Mangan, architect, 18, Guildhall Street, Preston.

Winchmore Hill.—Eight shops and flats, Winchmore Hill Road; C. W. Dennis.

Yiewsley.—Alterations and improvements to Marlborough Cinema; Cinema Co.